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Invasive Plants Established in the United States that are Found in Asia and Their Associated Natural Enemies
Volume 2



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Invasive Plants Established in the United States that are Found in Asia and Their Associated Natural Enemies

Volume 2

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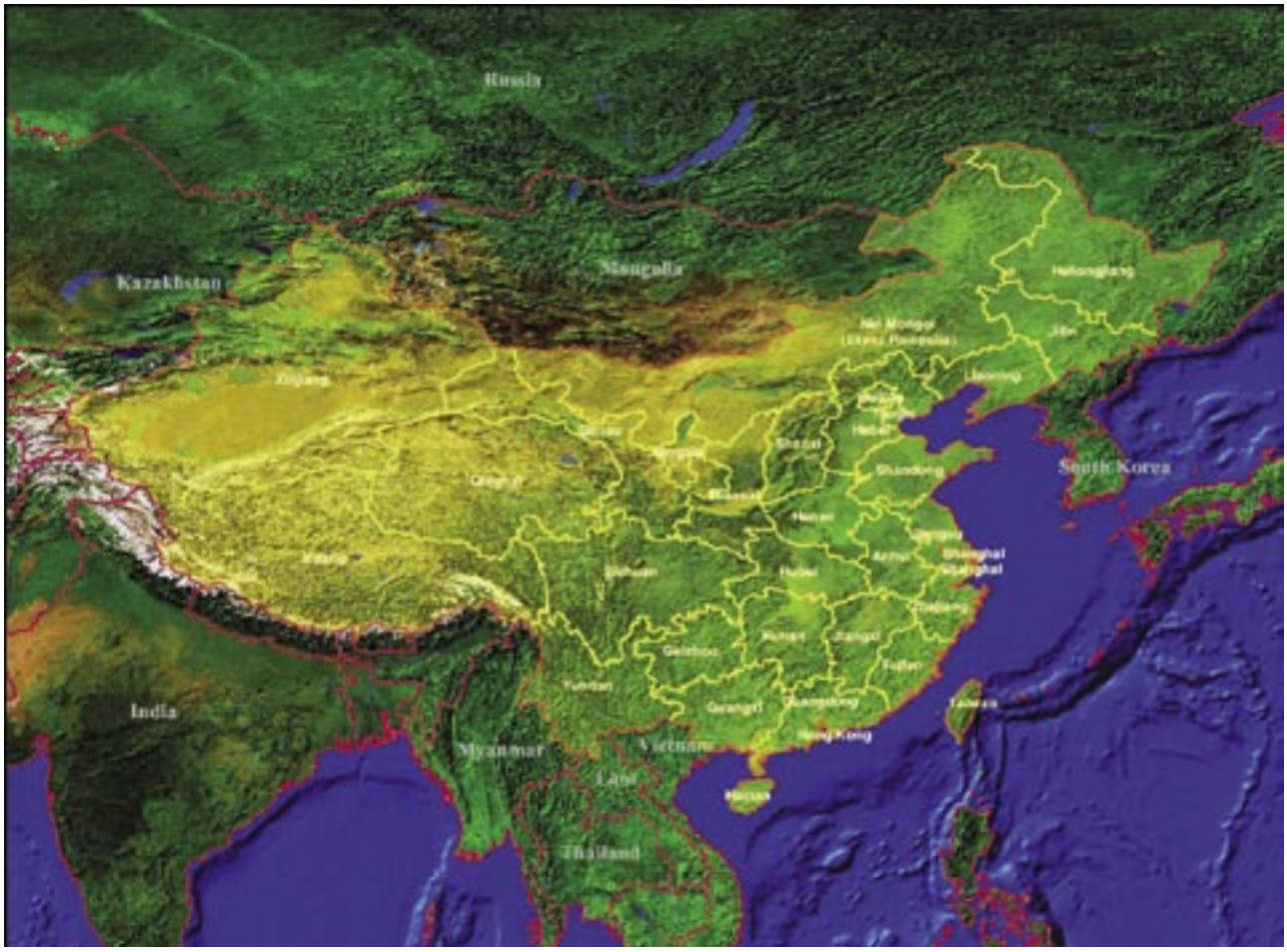
On The Cover: Left to right: *Polygonum perfoliatum* (Mile-a-minute) leaves, flowers and fruits (Denise Binion, USDA Forest Service, FHTET); *Melia azederach* (Chinaberry tree) leaves, flowers and fruits (Ted Bodner, Southern Weed Science Society, http://www.forestryimages.org; *Rubus phoenicolasius* (Wineberry) leaves and fruits (Denise Binion, USDA Forest Service, FHTET).



Provinces with plant distributions listed in this book are shown above.

Introduction

Invasive Plants Establishd in the United States that are Found in Asia and Their Associated Natural Enemies Volume 2 is the second publication in this series containing summaries of information on plants found in Asia that were introduced purposefully or accidentally into the United States. Most of the plants in Volume 2 originated in Asia although there is some confusion for several of the plants which probably originated in Europe; *Gypsophila paniculata, Phleum pratense, Populus alba, Rhamnus cathartica,* and *Viburnum opulus*. *Invasive Plants of Asian Origin Established in the United States and Their Natural Enemies* Volume 1 contianed 45 species whereas Volume 2 contains 41 species of plants. All of the information in both volumes was obtained by searching and reviewing the Chinese literature as well as discussions with Chinese scientists. Prior to these volumes, information was scattered, inaccessible and available only in Chinese. The scientific names that appear in the lists of natural enemies were obtained from the Chinese literature and the authors and technical reviewers did not review all of the names, but updated those in obvious error. The book also contains background information on the biology of each plant species, an image to help with identification, a map of its distribution in China, indices of scientific names for each plant species and a bibliography of over 200 references. The references are cited in the text as bracketed superscript numbers that are indexed in the reference section (pages 164 - 170). Also included are maps of United States distribution for all plant species. This book is intended to serve as a resource for regulatory and plant protection agencies worldwide.

The invasive plant species included in both volumes were selected according to their distribution, economic and ecological importance in the United States based on information from the following sources: *Invasive Plants: Weeds of the Global Garden* (Randall and Marinelli 1996); *Selection of Appropriate Future Target Weeds for Biological Control* (Pemberton 2002); *In:*

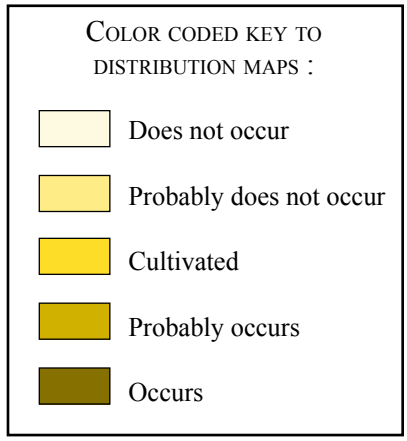
Biological Control of Invasive Plants in the Eastern United States (VanDriesche et al 2002), websites (http://plants.usda.gov, http://tncweeds.ucdavis.edu, http://www.aphis.usda.gov/ppq/weeds) and discussions with Dr. Bernd Blossey at Cornell University, Ithaca, NY and Dr. Ted Center at the USDA-ARS Invasive Plant Research Laboratory, Ft. Lauderdale, FL.

Knowledge of host range (H.R.) specificity is essential for biological control. Tables containing lists of fungal and arthropod natural enemies are provided for each plant species. The lists of fungal natural enemies were revised based on the Index Fungorum (http://www.indexfungorum.org/names/names.asp). Where appropriate, the old names are noted below the table. The host range of natural enemies is based on the organism's feeding preference. Each natural enemy table contains a letter code representing the host range of a given organism. The codes in Volume 2 have been updated from those in Volume 1. The natural enemies found on the target plant are coded as m, o, or p. Natural enemies coded mo, oo, or po are not found on the target plant. The code, using *Ailanthus altissima* as an example, is as follows:

m = recorded on *Ailanthus altissima*
mo = recorded on one species of the genus *Ailanthus* other than *Ailanthus altissima*
o = recorded on more than one species of *Ailanthus* including *Ailanthus altissima*
oo = recorded on more than one species of *Ailanthus* other than *Ailanthus altissima*
p = recorded on *Ailanthus* and other genera
po = recorded on more than one genus including *Ailanthus,* but excluding *Ailanthus altissima*

Distribution Maps

The China distribution maps were created in China, with ESRI ArcView 3.1. using data provided by the National Fundamental Geographic Information system of China (NFGIS). (See sample map and color key at right.) The United States distribution maps indicate whether the plant is present (green) or absent (yellow). Data for the United States distribution maps were obtained by consulting a variety of sources including the Biota of North America (BONAP) (http://www.bonap.org); the USDA Plants Database (http://plants.usda.gov); the Flora of North America (http://huh.hua.harvard.edu/FNA); and the National Park Service (http://nps.gov).



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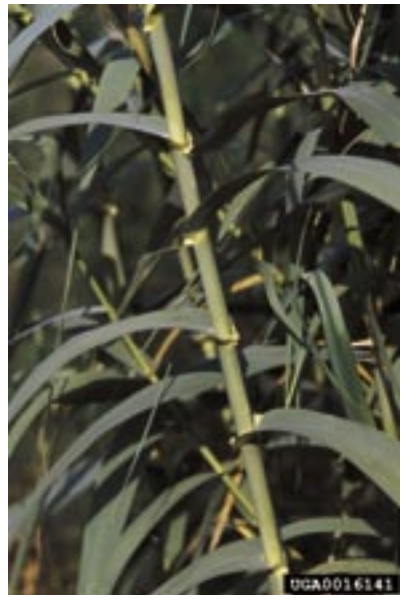
Arundo donax
Giant reed



Introduction
The genus *Arundo* contains 5 species occurring in tropical and subtropical regions. Two species are recorded from China[122].

Species of *Arundo* in China

Scientific Name
Arundo donax L.
A. formosana Hack

Taxonomy
Order: Graminales
Suborder: Gramineae
Family: Gramineae (Poaceae)
Subfamily: Arundioideae
Tribe: Arundineae
Subtribe: Arundinae Bews
Genus: *Arundo* L.
Species: *Arundo donax* L.

Description
Aundo donax is an erect, perennial grass that can grow to a height of 3-6 m. The culms reach a diameter of 1-4 cm, are hollow, with walls 2 to 7 mm thick and divided by partitions at the nodes. The nodes vary in length from 12-30 cm. The leaf sheath is glabrous and longer than the internode. Leaves are conspicuously 2-ranked, 30-50 cm long and 5-8 cm broad at the base and tapering to a fine point. Leaf bases are cordate and persistent. The large plume-like panicles are erect, 30-60 cm long. The spikelet, composed of 2-4 florets, is 10-12 mm in length. Glumes are lanceolate, nearly identical in size, and 3-5 veined, the lower lemma is 8-10 mm long, and about 4-5 mm for the upper. The flowers and fruits appear from September to December[58, 84, 87, 122].

Habitat
A. donax prefers sandy soil along riverbanks and roadsides[122].

Distribution
A. donax occurs in Guangdong, Guangxi, Guizhou, Hainan, Hunan, Jiangsu, Jiangxi, Sichuan, Yunnan, and Zhejiang provinces[58, 122] and it is cultivated in Henan, Hubei and Shandong provinces[9, 30, 53].

Economic Importance
The culm of *A. donax* is sometimes used for making reeds for musical wind instruments. Because of its high fibrin content, *A. donax* is used for paper making and artificial silk. Historically the entire plant was used as building material for rural cottages. It is also used for animal forage[58, 122].

Related Species
A. donax var. *coleotricha* Hack, native to Taiwan, can be distinguished from *A. donax* by the densely hairy leaf sheath. *A. donax* var. *versiocolor* Stokes, has graceful stripes on the leaves. The much shorter *A. formosana*, with a height of 60-120 cm, is also reported from Taiwan[58, 77, 122].

Natural Enemies of *Arundo*
Five fungi and one arthropod have been recorded in association with plants of the genus *Arundo*.

Fungi

Phylum	Family	Species	H. R.	Ref.
Ascomycota	Meliolaceae	*Meliola arundinis* Pat.	p	[73]
			po	[26]
	Phyllachoraceae	*Phyllachora arundinis* Sawada	mo	[26]
Basidiomycota	Pucciniaceae	*Puccinia arundinis-donacis* T. Hirats.	m	[170]
Anamorphic *Splanchnonema*		*Helminthosporium arundinis* Sawada	mo	[26]
Anamorphic Uredinales		*Uredo arundinis-donacis* F.L. Tai	m	[26]

Arthropods

Order	Family	Species	H. R.	Ref.
Lepidoptera	Noctuidae	*Simyra albovenosa* (Goeze)	p	[15]

Recorded as *Arsilonche albovenosa* (Goeze)

Carex kobomugi

Japanese sedge, Asiatic sand sedge

Introduction

The genus *Carex* contains more than 2000 species worldwide. In China, approximately 500 species have a nationwide distribution[114].

Taxonomy

Order: Cyperales
Family: Cyperaceae
Subfamily: Caricoideae Pax
Tribe: Cariceale Nees
Genus: *Carex* L.
Subgenus: Carex
Section: Macrocephalae Kükenth
Species: *Carex kobomugi* Ohwi

Description

C. kobomugi is a perennial rhizomatous sedge. The culm is obtuse triangular, smooth, 10-20 cm in height and 3-4 mm in width, and covered with aged leaf sheath in the base. Leaves are leathery, toothed and yellow-green in color, often longer than the culms. Inflorescence is dioecious, usually spike. Male flower clusters are oblong in shape, 4-5 cm long and 1.2-1.3 cm wide, with lanceolate scales, while female flower clusters are ovate or oblong, 1.2-1.6 cm long and 4-5

Species of *Carex* in China

Scientific Name	Scientific Name
C. adrienii E. G. Camus	*C. maculata* Boott
C. aequialta Kükenth.	*C. magnoutriculata* Tang et Wang ex L. K. Dai
C. agglomerata C. B. Clarke	*C. makinoensis* Franch.
C. alba Scop.	*C. makuensis* P. C. Li
C. alliiformis C. B. Clarke	*C. manca* Boott
C. alopecuroides D. Don	*C. mancaeformis* C. B. Clarke ex Franch.
C. alta B*oott*	*C. maorshanica* Y. L. Chou
C. altaica Gorodk.	*C. maquensis* Y. C. Yang
C. amgunensis Fr. Schmidt	*C. maubertiana* Boott
C. angarae Steud.	*C. maximowiczii* Miq.
C. angustinowiczii Meinsh. ex Korsh.	*C. meihsienica* K. T. Fu
C. angustior Mack.	*C. melanantha* C. A. Mey.
C. angustiutricula Wang et Tang ex L. K. Dai	*C. melanocephala* Turcz.
C. anningensis Wang et Tang ex P. C. Li	*C. melanostachya* M. Von Bieb. ex Willd.
C. aperta Boott	*C. melinacra* Franch.
C. aphanolepis Franch. et Savat.	*C. metallica* Levl. et Vant.
C. appendiculata (Trautv.) Kükenth.	*C. meyeriana* Kunth
C. arcatica Meinsh.	*C. micrantha* Kükenth.
C. arguensis Turcz. ex Trev.	*C. microglochin* Wahl.

Scientific Name	Scientific Name
C. argyi Lével.et Vant.	*C. middendorffii* Fr. Schmidt.
C. aridula V. Krecz.	*C. minxianensis* S. Y. Liang
C. arisanensis Hayata	*C. mitrata* Franch.
C. aristatisquamata Tang et Wang ex L. K. Dai	*C. miyabei* Franch.
C. aristulifera P. C. Li	*C. mollicula* Boott
C. arnellii Christ ex Scheutz	*C. mollissima* Christ.
C. ascocetra C. B. Clarke	*C. montis-everestii* Kükenth.
C. asperifructus Kükenth.	*C. montis-wutaii* T. Koyama
C. atrata L.	*C. moorcroftii Falc. ex* Boott
C. atrofusca Schkuhr.	*C. morii* Hayata
C. atrofuscoides K. T. Ku	*C. mosoynensis* Franch.
C. austro-occidentalis Wang et Tang	*C. motuoensis* Y. C. Yang
C. austrosinensis Tang et Wang ex S. Y. Liang	*C. moupinensis* Franch.
C. autumnalis Ohwi	*C. mucronatiformis* Tang et Wang
C. baccans Nees	*C. muliensis* Hand.-Mazz.
C. baimaensis S. W. Su	*C. munda* Boott
C. baiposhanensis P. C. Li	*C. myosurus* Nees
C. baohuashanica Tang et Wang ex L. X. Dai	*C. nachiana* Ohwi
C. bilateralis Hayata	*C. nakaoana* T. Koyama
C. bodinieri Franch.	*C. nanchuanensis* Chü ex S. Y. Liang
C. bohemica Schreb.	*C. nemostachys* Steud.
C. bostrychostigma Maxim.	*C. neodigyna* P. C. Li
C. brachyathera Ohwi	*C. neopolycephala* Tang et Wang ex L. K. Dai
C. breviaristata K. T. Fu	*C. nervata* Franch. et Savat.
C. breviculmis R. Br.	*C. neurocarpa* Maxim.
C. brevicuspis C. B. Clarke	*C. nitidiutriculata* L. K. Dai
C. breviscapa C. B. Clarke	*C. nivalis* Boott
C. brownii Tuckerm.	*C. nubigena* D. Don
C. brunnea Thunb.	*C. nugata.* Ohwi
C. caespititia Nees	*C. obovatosquamata* Wang et Y. L. Chang ex P. C. Li
C. caespitosa L.	*C. obscura* Nees
C. calcicola Tang et Wang	*C. obscuriceps* Kükenth.
C. callitrichos V. Krecz.	*C. obtusata* Liljebl.
C. canaliculata P. C. Li	*C. oedorrhampha* Nelmes
C. capillacea Boott	*C. oligostachya* Nees
C. capillaris L.	*C. olivacea* Boott
C. capilliformis Franch.	*C. omeiensis* Tang et Wang
C. capricornis Meinsh. ex Maxim.	*C. omiana* Franch. et Savat.
C. cardiolepis Nees	*C. onoei* Franch. et Savat.
C. caucasica Stev.	*C. orbicularinucis* L. K. Dai
C. caudispicata Wang et Tang ex P. C. Li	*C. orbicularis* Boott
C. cheniana Tang et Wang ex S. Y. Liang	*C. orthostachys* C. A. Mey.
C. chinensis Retz.	*C. otaruensis* Franch.
C. chinganensis Litw.	*C. otruba* Podp.
C. chiwuana Wang et Tang ex P. C. Li	*C. ovatispiculata* Y. L. Chang ex S. Y. Liang
C. chlorocephalula Wang et Tang ex P. C. Li	*C. oxyphylla* Franch.

Scientific Name	Scientific Name
C. chlorostachys Stev.	*C. pachyneura* Kitag.
C. chrysolepis Franch. & Savat.	*C. pallida* C. A. Mey.
C. chuiana Wang et Tang ex P. C. Li	*C. pamirensis* C. B. Clarke ex B. Fedtsch.
C. chuii Nelmes	*C. paracuraica* Wang et Y. L. Chang
C. chungii C. P. Wang	*C. parva* Nees
C. cinerascens Kükenth.	*C. paxii* Kükenth.
C. commixta Steud.	*C. pediformis* C. A. Mey.
C. composita Boott	*C. peiktusani* Kom.
C. confertiflora Boott	*C. peliosanthifolia* Wang et Tang ex P. C. Li
C. continua C. B. Clarke	*C. perakensis* C. B. Clarke
C. coriophora Fisch. et C. A. Mey. ex Kunth	*C. pergracilis* Nelmes
C. courtallensis Nees ex Boott	*C. phacota* Spreng.
C. cranaocarpa Nelmes	*C. phyllocephala* T. Koyama
C. craspedotricha Nelmes	*C. physodes* M.-Bieb.
C. crebra V. Krecz.	*C. pilosa* Scop.
C. cremostachys Franch.	*C. pisiformis* Boott
C. cruciata Wahlenb.	*C. planiculmis* Kom.
C. cruenta Nees	*C. planiscapa* Chun et How
C. cryptocarpa C. A. Mey.	*C. platysperma* Y. L. Chang et Y. L. Yang
C. cryptostachys Brongn	*C. poculisquama* Kükenth.
C. curaica Kunth	*C. polymascula* P. C. Li
C. curta Good.	*C. polyschoenoides* K. T. Fu
C. cylindriostachya Franch.	*C. praeclara* Nelmes
C. dahurica Kükenth.	*C. praelonga* C. B. Clarke
C. dailingensis Y. L. Chou	*C. prolongata* Kükenth.
C. davidii Franch.	*C. pruinosa* Boott
C. deciduisquama Wang et Tang ex P. C. Li	*C. przewalski* Egorova
C. delavayi Franch.	*C. pseudo-curaica* Fr. Schmidt
C. densefimbriata Wang et Tang ex S. Y. Liang	*C. pseudo-cyperus* L.
C. densicaespitosa L. K. Dai	*C. pseudo-dispalata* K. T. Fu
C. deqinensis L. K. Dai	*C. pseudofoetida* Kükenth.
C. diandra Schrank	*C. pseudohumilis* Wang et Y. L. Chang ex P. C. Li
C. dichroa Freyn	*C. pseudo-laticeps* Tang et Wang ex S. Y. Liang
C. dickinsii Franch. et Savat.	*C. pseudo-ligulata* L. K. Dai
C. dielsiana Kükenth.	*C. pseudo-longerostrata* Y. L. Chang et Y. L. Yang
C. dimorpholepis Steud.	*C. pseudo-phyllocephala* L. K. Dai
C. diplodon Nelmes	*C. pseudo-supina* Y. C. Tang ex L. K. Dai
C. dispalata Boott ex A. Gray	*C. psychrophila* Nees
C. disperma Dew	*C. pterocaulos* Nelmes
C. doisutepensis T. Koyama	*C. pumila* Thunb.
C. dolichostachya Hayata	*C. purpureo-squamata* L. K. Dai
C. doniana Spreng.	*C. purpureotincta* Ohwi
C. drepanorhyncha Franch.	*C. purpureovagina* Wang et Y. L. Chang
C. drymophila Turcz	*C. putuoensis* S. Y. Liang
C. duriuscula C. A. Mey.	*C. pycnostachya* Kar. et Kir.
C. duvaliana Franch. et Savat.	*C. qingdaoensis* F. Z. Li et S. J. Fan

Scientific Name	Scientific Name
C. earistata Wang et Y. L. Chang ex S. Y. Liang	*C. qinghaiensis* Y. C. Yang
C. echinochloaeformis Y. L. Chang et Y. L. Yang	*C. qingyangensis* S. W. Su et S. M. Xu
C. egena Lévl. et Vant.	*C. qiyunensis* S. W. Su et S. M. Xu
C. eleusinoides Turcz. ex Kunth	*C. quadriflora* (Kükenth.) Ohwi
C. emineus Nees	*C. raddei* Kükenth.
C. enervis C. A. Mey.	*C. radiciflora* Dunn
C. ensifolia Turcz.	*C. radicina* C. P. Wang
C. ereica Tang et Wang ex L. K. Dai	*C. rafflesiana* Boott
C. eremopyroides V. Krecz.	*C. rara* Boott
C. eriophylla (Kükenth.) Komarov.	*C. recurvisaccus* T. Koyama
C. erythrobasis Lévl. et Vant.	*C. remotiuscula* Wahlenb.
C. fargesii Franch.	*C. reptabunda* (Trautv.) V. Krecz.
C. fastigiata Franch.	*C. retrofracta* Kükenth.
C. fenghuangshanica Wang et Tang ex P. C. Li	*C. rhizopoda* Maxim.
C. fidia Nees	*C. rhynchophora* Franch.
C. filamentosa K. T. Fu	*C. rhynchophysa* C. A. Mey.
C. filicina Nees	*C. ridongensis* P. C. Li
C. filipedunculata S. W. Su	*C. riparia* Curt.
C. filipes Franch. et Savat.	*C. rochebruni* Franch. et Savat.
C. finitima Boott	*C. rostrata* Stokes
C. fluviatilis Boott	*C. rubro-brunnea* C. B. Clarke
C. foraminata C. B. Clarke	*C. rugulosa* Kükenth.
C. foraminatiformis Y. C. Tang et S. Y. Liang	*C. sadoensis* Franch.
C. forficula Franch. et Sav.	*C. sagaensis* Y. C. Yang
C. forrestii Kükenth.	*C. satakeana* T. Koyama
C. fulvo-rubescens Hayata	*C. satsumensis* Franch. et Sav.
C. funingensis Tang et Wang ex S. Y. Liang	*C. saxicola* Tang et Wang
C. gaoligongshanensis P. C. Li	*C. scabrifolia* Steud.
C. gentilis Franch.	*C. scabrirostris* Kükenth.
C. gibba Wahlenb.	*C. scaposa* C. B. Clarke
C. giraldiana Kükenth.	*C. schmidtii* Meinsh.
C. glabrescens (Kükenth.) Ohwi	*C. schneideri* Nelmes
C. glaucaeformis Meinsh.	*C. sclerocarpa* Franch.
C. globistylosa P. C. Li	*C. scolopendriformis* Wang et Tang ex P. C. Li
C. globularis L.	*C. sedakovoii* C. A. Mey.
C. glossostigma Han.-Mazz.	*C. sendaica* Franch.
C. gmelinii Hook. et Arn.	*C. serreana* Hand.-Mazz.
C. gonggaensis P. C. Li	*C. setigera* D. Don
C. gongshanensis Tang et Wang ex Y. C. Yang	*C. setosa* Boott
C. grallatoria Maxim.	*C. shaanxiensis* Wang et Tang ex P. C. Li
C. graminiculmis T. Koyama	*C. shandanica* Y. C. Yang
C. grandiligulata Kükenth.	*C. shangchengensis* S. Y. Liang
C. gynocrates Wormskj. ex Drejer	*C. shanghaiensis* S. X. Qian et Y. Q. Liu
C. haematostoma Nees	*C. shanghangensis* S. Y. Liang
C. hancockiana Maxim.	*C. shuangbainsis* L. K. Dai
C. handelii Kükenth.	*C. shuchengensis* S. W. Su et Q. Zhang

Scientific Name	Scientific Name
C. harealihinganica Y. L. Chang	*C. sichouensis* P. C. Li
C. harlandii Boott	*C. siderosticta* Hance
C. harrysmithii Kükenth.	*C. simulans* C. B. Clarke
C. hastata Kükenth	*C. sino-aristata* Tang et Wang ex L. K. Dai
C. hattoriana Nakai	*C. sino-dissitiflora* Tang et Wang ex L. K. Dai
C. hebecarpa C. A. Mey.	*C. siroumensis* Koidz.
C. henryi C. B. Clarke ex Franch.	*C. sociata* Boott
C. heshuonensis S. Y. Liang	*C. songarica* Kar. et Kir.
C. heterolepis Bunge	*C. sotoi* Ohwi
C. heterostachya Bge.	*C. spachiana* Boott
C. heudesii Lévl. et Vant.	*C. sparsiflora* (Wahlenb.) Steud.
C. hirtella Drejer	*C. speciosa* Kunth.
C. hirtelloides (Kükenth.) Wang et Tang ex P. C. Li	*C. stenocarpa* Turcz. ex V. Krecz.
C. hirticaulis P. C. Li	*C. stipata* Muhl. ex Willd.
C. hirtiutriculata L. K. Dai	*C. stipitinux* C. B. Clarke
C. hongyuanensis Y. C. Tang et S. Y. Liang	*C. stipitiutriculata* P. C. Li
C. huashanica Tang et Wang ex L. K. Dai	*C. stramentitia* Boott
C. humida Y. L. Chang et Y. L. Yang	*C. subcernua* Ohwi
C. humilis Leyss.	*C. subebracteata* (Kükenth.) Ohwi
C. huolushanensis P. C. Li	*C. subfilicinoides* Kükenth.
C. hypochlora Freyn	*C. submollicula* Tang et Wang ex L. K. Dai
C. idzuroei Franch. et Savat.	*C. subperakensis* L. K. Ling et Y. Z. Huang
C. inanis Kunth	*C. subpumila* Tang et Wang ex L. X. Dai
C. indica L.	*C. subtransversa* C. B. Clarke
C. indicaeformis Wang et Tang ex P. C. Li	*C. subtumida* (Kükenth.) Ohwi
C. infossa C. P. Wang	*C. sutchuensis* Franch.
C. infuscata Nees	*C. taihuensis* S. W. Su et S. M. Xu
C. insignis Boott.	*C. taipaishanica* K. T. Fu
C. ischnostachya Steud.	*C. taldycola* Meinsh.
C. ivanoviae Egorova.	*C. tangiana* Ohwi
C. jaluensis Kom.	*C. tangii* Kükenth.
C. japonica Thunb.	*C. tangulashanensis* Y. C. Yang
C. jiaodongensis Y. M. Zhang et X. D. Chen	*C. tapintzensis* Franch.
C. jinfoshanensis Tang et Wang ex S. Y. Ling	*C. tarumensis* Franch.
C. jiuxianshanensis L. K. Dai et Y. Z. Huang	*C. tatsiensis* (Franch.) Kükenth.
C. jizhuangensis S. Y. Liang	*C. tatsutakensis* Hayata
C. kansuensis Nelmes	*C. teinogyna Boott*
C. kaoi Tang et Wang ex S. Y. Liang	*C. tenebrosa Boott*
C. karlongensis Kükenth.	*C. tenuiflora* Wahlenb.
C. karoi (Freyn) Freyn	*C. tenuiformis* Lévl. et Vant.
C. kiangsuensis Kükenth.	*C. tenuipaniculata* P. C. Li
C. kirganica Kom.	*C. tenuispicula* T. Tang ex S. Y. Liang
C. kirinensis Wang et Y. L. Chang	*C. teres Boott*
C. kobomugi Ohwi	*C. thibetica* Franch.
C. korshinskyi Kom.	*C. thompsonii* Franch.
C. kuchunensis Tang et Wang ex S. Y. Liang.	*C. thomsonii* Boott

Scientific Name	Scientific Name
C. kucyniakii Raymond	*C. thunbergii* Steud.
C. kwangsiensis Wang et Tang ex P. C. Li	*C. transversa* Boott
C. kwangtoushanica K. T. Fu	*C. tricephala* Böcklr.
C. lachenalii Schkuhr	*C. tristachya* Thunb.
C. laeta Boott	*C. truncatigluma* C. B. Clarke
C. laevissima Nakai	*C. tsaiana* Wang et Tang ex P. C. Li
C. lancangensis S. Y. Liang	*C. tsiangii* Wang et Tang
C. lanceolata Boott	*C. tsoi* Merr. et Chun
C. lancifolia C. B. Clarke	*C. tuminensis* Kom.
C. lancisquamata L. K. Dai	*C. tungfangensis* L. K. Dai et S. M. Huang
C. laricetorum Y. L. Chou	*C. turkestanica* Rgl.
C. lasiocarpa Ehrh.	*C. uda* Maxim.
C. laticeps C. B. Clarke ex Franch.	*C. ulobasis* V. Krecz.
C. latisquamea Kom.	*C. unisexualis* C. B. Clarke
C. laxa Wahlenb.	*C. urelytra* Ohwi
C. ledebouriana C. A. Mey. et Trev.	*C. ussuriensis* Kom.
C. lehmanii Drejer	*C. vanheurckii* Müell. Arg.
C. leiorhyncha C. A. Mey.	*C. vesicaria* L.
C. lienchengensis S. Y. Liang et Y. Z. Huang	*C. vesicata* Meinsh.
C. ligata Boott	*C. viridimarginata* Kükenth.
C. ligulata Nees	*C. vulpina* L.
C. limosa L.	*C. wawuensis* Chü
C. limprichtiana Kükenth.	*C. wenshanensis* L. K. Dai
C. lingii Wang et Tang	*C. wui* Chii ex L. K. Dai
C. liouana Wang et Tang	*C. wushanensis* S. Y. Liang
C. liqingii Tang et Wang ex S. Y. Liang	*C. wutuensis* K. T. Fu
C. lithophila Turcz.	*C. wuyishanensis* Y. C. Tang ex S. Y. Liang
C. litorhyncha Franch.	*C. xiphium* Kom.
C. liui T. Koyama & Chuang	*C. yajiangensis* Tang et Wang
C. loliacea L.	*C. yamatsutana* Ohwi
C. longerostrata C. A. Mey.	*C. yangshuoensis* Tang et Wang ex S. Y. Liang
C. longipes D. Don	*C. ypsilandraefolia* Wang et Tang
C. longispiculata Y. C. Yang	*C. yuexiensis* S. W. Su et S. M. Xu
C. longpanlaensis S. Y. Liang	*C. yulungshanensis* P. C. Li
C. longshengensis Y. C. Tang et S. Y. Liang	*C. yunlingensis* P. C. Li
C. longxishanensis S. Y. Liang	*C. yunnanensis* Franch.
C. luctuosa Franch.	*C. zekogensis* Y. C. Yang
C. lushanensis Kükenth.	*C. zhenkangensis* Wang et Tang
C. maackii Maxim.	*C. zhonghaiensis* S. Y. Liang
C. macrandrolepis Lévl. et Vant.	*C. zizaniaefolia* Raymond
C. macrosandra (Franch.) V. Krecz.	*C. zunyiensis* Tang et Wang

mm wide, with ovate scales that are leathery and veined. Fruits are olive nutlets, which are oblong or oblong-obovate with length of 5-5.5 mm, and enclosed in a papery sac[114].

Habitat

C. kobomugi occurs along riverbanks and sandy lakeshores[114].

Distribution

Carex kobomugi occurs in Heibei, Heilongjiang, Jiangsu, Liaoning, Shandong, Taiwan, and Zhejiang provinces[114].

Economic Importance

The stem and leaf fibers can be used for papermaking. The starchy fruits are edible[114].

Natural Enemies of *Carex*

Approximately 71 species of fungi have been found in association with members of the genus *Carex*, but there are none identified from *C. kobomugi*. Only seven arthropods are recorded.

Fungi

Phylum	Family	Species	H. R.	Ref.
Ascomycota	Mycosphaerellaceae	Mycosphaerella tassiana (De Not.) Johanson	po	[26]
Basidiomycota	Anthracoideaceae	Anthracoidea angulata (Syd.) Boidol & Poelt	oo	[64]
		Anthracoidea butleri (H. & P. Sydow) H. & P. Sydow	oo	[64]
		Anthracoidea caricis (Pers.) Bref.	oo	[64]
			oo	[26]I
		Anthracoidea caryophylleae Kukkonen	oo	[64]
		Anthracoidea eleocharidis Kukkonen	oo	[64]
		Anthracoidea intercedens Nannf.	oo	[64]
		Anthracoidea microspora L. Guo	oo	[64]
		Anthracoidea misandrae Kukkonen	oo	[64]
		Anthracoidea nepalensis Kakish. & Y. Ono	oo	[64]
		Anthracoidea paniceae Kukkonen	oo	[64]
		Anthracoidea siderostictae Kukkonen	oo	[64]
		Anthracoidea subinclusa (Körn.) Bref.	oo	[64]
			oo	[26]II
		Anthracoidea vankyi Nannf.	oo	[64]
	Cintractiaceae	Cintractia arctica Lagerh.	oo	[26]
		Tolyposporium aterrimum (Tul. & C. Tul.) Dietel	oo	[64]
	Farysiaceae	Farysia butleri Syd	po	[26]
		Farysia merrillii (Henn.) Syd. & P. Syd.	po	[26]
		Farysia orientalis L. Ling	mo	[26]
		Farysia thuemenii (A.A. Fisch. Waldh.) Nannf.	oo	[26]III

Phylum	Family	Species	H. R.	Ref.
	Glomosporiaceae	Thecaphora aterrima Tul. & C. Tul.	oo	[26]
	Pucciniaceae	Puccinia angustata Peck	oo	[26]
		Puccinia aomoriensis Syd. & P. Syd.	po	[170]
			po	[26]
		Puccinia atrofusca (Dudley & C.H. Thomps.) Holw.	po	[170]
		Puccinia biporosa J.Y. Zhuang	mo	[170]
		Puccinia breviculmis Dietel	mo	[26]
			oo	[170]
		Puccinia caricicola Fuckelel	mo	[170]
		Puccinia caricina DC.	po	[26]
		Puccinia caricis Rebent.	po	[170]
		Puccinia caricis-brunneae Dietel	oo	[26]
			mo	[170]
		Puccinia caricis-filicinae Barclay	mo	[26]
			oo	[170]
		Puccinia caricis-gibbae Dietel	oo	[26]
			oo	[170]
		Puccinia caricis-hancockianae J.Y. Zhuang & S.X. Wei	mo	[170]
		Puccinia caricis-japonicae Dietel	oo	[170]
		Puccinia caricis-lanceolatae Morim.	mo	[170]
		Puccinia caricis-lingii J.Y. Zhuang	mo	[170]
		Puccinia caricis-molliculae Syd. & P. Syd.	oo	[170]
			mo	[26]
		Puccinia caricis-nubigenae Padwick & A. Khan	oo	[170]
		Puccinia caricis-pilosae Miura	oo	[170]
		Puccinia caricis-pseudololiaceae Homma	oo	[170]
		Puccinia caricis-rhizopodae Miura	oo	[170]

Phylum	Family	Species	H. R.	Ref.
		Puccinia caricis-siderostictae Dietel	mo	[26]
			mo	[170]
		Puccinia caricis-thunbergii Homma	oo	[170]
		Puccinia congesta Berk. & Broome	oo	[26]
			oo	[170]
		Puccinia dioicae Magnus	po	[170]
			po	[26]
		Puccinia dioicae var. extensicola (Plowr.) D.M. Hend.	po	[26]
		Puccinia duplex Jørst.	mo	[170]
			mo	[26]
		Puccinia hainanensis J.Y. Zhuang & S.X. Wei	mo	[170]
		Puccinia humilicola Hasler	oo	[170]
		Puccinia hyalina Dietel	oo	[26]
			oo	[170]
		Puccinia jaceae-leporinae Tranzschel	oo	[170]
		Puccinia karelica Tranzschel	mo	[170]
		Puccinia leucocephala J.Y. Zhuang & S.X. Wei	mo	[170]
		Puccinia lineariformis Syd. & P. Syd.	oo	[170]
			oo	[26]
		Puccinia lyngbyei Miura	oo	[170]
		Puccinia mandshurica Miura	mo	[170]
			mo	[26]
		Puccinia microsora Körn.	oo	[170]
		Puccinia miyakei Syd.	mo	[170]
			mo	[26]
		Puccinia moiwensis Miura	oo	[170]
		Puccinia opizii Bubák	oo	[170]

Phylum	Family	Species	H. R.	Ref.
		Puccinia saepta Jørst.	mo	[26]
			mo	[170]
		Puccinia subhyalina Tranzschel	oo	[26]
			oo	[170]
		Puccinia tahensis Tranzschel	mo	[170]
		Puccinia yaramesuga Homma	oo	[170]
		Puccinia yokogurae Henn.	oo	[170]
			mo	[26]
		Uromyces perigynius Halst.	oo	[26]
	Urocystaceae	Urocystis fischeri Körn.	oo	[26]
	Ustilaginaceae	Orphanomyces arcticus (Rostr.) Savile	oo	[64]
		Schizonella melanogramma (DC.) J. Schröt.	oo	[64]
Anamorphic Mycosphaerella		Septoria caricis Pass.	oo	[26]
		Septoria nigrificans Pat.	oo	[26]

Arthropods

Order	Family	Species	H. R.	Ref
Coleoptera	Chrysomelidae	Geinella invenusta (Jacobson)	po	[201]
Homoptera	Callaphididae	Iziphya flabellai (Sanborn)	m	[113]
Lepidoptera	Crambidae	Catagela adjurella Walker	po	[169]
	Hesperiidae	Ochlodes subhyalina Bremer & Grey	po	[178]
	Noctuidae	Eustrotia uncula (Clerck)	oo	[228]
		Plusia festata Graeser	po	[224]
	Satyridae	Erebia ligea (L.)	po	[219]

Gypsophila paniculata
Baby's breath

Introduction
There are approximately 150 members of the genus *Gypsophila* worldwide primarily occurring in temperate Asia and Europe. Seventeen species occur in China, excluding *Gypsophila elegans* Marschall von Bieberstein, a cultivated species that is native to southwestern Asia and southeastern Europe[136].

Species of *Gypsophila* in China

Scientific Name	Scientific Name
G. altissima L.	*G. oldhamiana* Miq.
G. capituliflora Rupr.	*G. pacifica* Kom.
G. cephalotes (Schrenk) Williams	***G. paniculata* L.**
G. cerastioides D. Don	*G. patrinii* Ser.
G. davurica Turcz. ex Fenzl	*G. perfoliata* L.
G. desertorum (Bge.) Fenzl	*G. sericea* (Ser.) Krylov
G. huashanensis Y. W. Tsui et D. Q. Lu	*G. spinosa* D. Q. Lu
G. licentiana Hand. -Mazz.	*G. tschiliensis* J. Krause
G. muralis L.*	

* Revised *Flora of China*, and not listed in the *Flora Reipublicae Popularis Sinicae*

Taxonomy
Order: Centrospermae
Suborder: Caryophyllineae
Family: Caryophyllaceae
Subfamily: Silenoideae A. Br.
Tribe: Diantheae Pax
Genus: *Gypsophila* L.
Section: Rokejeka (Forssk.) A. Br.
Species: *Gypsophila paniculata* L.

Description
G. paniculata is a perennial herbaceous plant about 30-80 cm high with robust roots. The stem, either solitary or sparsely clustered, is erect and multi-branched, glabrous, or glandular hairy in the lower part. Leaves are lanceolate, or linear, 2-5 cm long and 2.5-7 mm wide with an acuminate apex and a conspicuous midrib. The compound cymes bear numerous small flowers on glabrous, slender pedicels which are about 2-6 mm long. The bracts are triangular with an abruptly acute apex. The calyx is broadly campanulate, 1.5-2 mm long, purple veined, ovate lobed, with a scarious margin. Petals are white or pink, spatulate, about 3 mm long and 1 mm wide, with a truncate or obtuse apex. The filaments are flat, linear, and equal to the petal in length, with globose anthers. The ovoid ovary is 1 mm in diameter with slender styles. The flowers appear from June through August, followed in August through September by globose capsules that are longer than the persistent calyx, and contain reddish brown, obtusely tuberculate seeds about 1 mm in diameter[135, 136].

Habitat and Distribution
G. paniculata occurs in grasslands, on rocky slopes, fixed dunes, in floodplains, and crop fields at elevations of 400-1500 m. It is reported to occur in the Altaic mountain areas of northern Xinjiang and Taxkorgan of western Xinjiang[20, 135, 136]. Cultivation has been reported in Anhui, Beijing, Hebei, Heilongjiang, and Shanghai provinces[17, 35, 67. 154, 221].

Economic Importance
The root and stem of *G. paniculata* are medically useful. *G. paniculata* is also cultivated as an ornamental[136].

Related Species
G. perfoliata L., the other species in the Section Rokejeka, differs from *G. paniculata* by its obovate oblong or obovate leaf which is covered with yellow, glandular hairs. The calyx is

2-4 mm long, and green veined. The petals are oblong, 5 mm long and 2 mm wide. *G. perfoliata* flowers July through August and fruits in August through September. It occurs in forest grasslands, wet riversides, saline-alkaline soils, and steppe sands at elevations of 500-1000 m in the Altaic mountain area of northern Xinjiang[134, 136].

Natural Enemies of *Gypsophila*

Three species of fungi are listed for the genus *Gypsophila*, but none is associated with *G. paniculata*.

Fungi

Phylum	Family	Species	H. R.	Ref.
Basidiomycota	Pucciniaceae	*Puccinia behenis* G.H. Otth	po	[229]
		Puccinia gypsophilae Liou & Wang	oo	[26]
		Uromyces dianthi (Pers.) Niessl	po	[26]

Lepidium latifolium
Broadleaved pepper weed

Introduction
There are 180 members of the genus *Lepidium* worldwide. Sixteen species are reported from China [218].

Taxonomy
Order: Papaverales
Suborder: Capparineae
Family: Cruciferae (Brassicaceae)
Tribe: Lepidieae DC.
Genus: *Lepidium* L.
Section: Lepidium
Species: *Lepidium latifolium* L.

Description
Lepidium latifolium is an herbaceous perennial about 30-150 cm in length. The erect stems are glabrous or sparsely pubescent, branched in the upper part, and woody at the base. The basal leaves and the leaves in the lower part of the stems are leathery, oblong-lanceolate, or ovate, 3-6 cm long and 3-5 cm wide, abruptly acute or obtuse at the apex, cuneate at the base, and entire or dentate margins. The petiole is about 1-3 cm in length. The sessile upper leaves are lanceolate or oblong-elliptic, 2-5 cm long and 5-15 cm wide. The paniculate raceme has glabrescent sepals, which are ovoid oblong, or nearly orbicular, about 1 mm in height, with a rounded apex. Petals are white, obovate, about 2 mm long, with a rounded apex. The flowers appear from May to July. In July through September, oblong-elliptic fruits appear. Fruits are 1.5-3 mm long, glabrous, nearly glabrous, or pubescent, and wingless. Seeds are light brown, broadly elliptic, about 1 mm long, and also wingless[61, 218].

Species of *Lepidium* in China

Scientific Name	Scientific Name
L. alashanicum S. L. Yang	*L. ferganense* Korsh.
L. apetalum Willd.	*L. lacerum* C. A. Meyer
L. campestre (L.) R. Br.*	***L. latifolium* L.**
L. capitatum Hook. f. et Thoms.	*L. obtusum* Basin.
L. cartilagineum (J. May.) Thell.	*L. perfoliatum* L.
L. cordatum Willd. ex Stev.	*L. ruderale* L.
L. cuneiforme C. Y. Wu	*L. sativum* L.
L. densiflorum Schrad.	*L. virginicum* L.

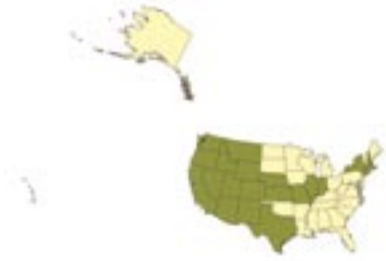
* Recorded as *L. campestre* (L.) R. Br. f. *glabratum* (Lej. et Court.) Thell. in *FRPS*.

Habitat
L. latifolium occurs in field margins and saline meadows, along roadsides, and on slopes, at elevations of 100-4300 m[218]. *L. latifolium* can also be found in crop field margins, along roadsides and arid, sandy places at elevations of 600-1200 m in Xinjiang[21, 218].

Distribution
L. latifolium occurs in Gansu, Hebei, Heilongjiang, Henan, Inner Mongolia, Liaoning, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Tibet, and Xinjiang provinces[218].

Economic Importance
L.latifolium is used medicinally in northwestern China[218].

Related Species
L. obtusum Basin is distinguished from *L. latifolium* by its obtuse apex,



basally cordate fruits, and raceme inflorescence. It occurs in pastures, field margins, waste places, and deserts at elevations of 400–2800 m in Gansu, Inner Mongolia, Ningxia, Qinghai, Tibet, and Xinjiang provinces[61, 218].

Natural Enemies of *Lepidium*

Seven fungi have been recorded as associated with members of the genus *Lepidium*. Nineteen arthropods are listed in association with members of the genus *Lepidium.*

Fungi

Phylum	Family	Species	H. R.	Ref.
Ascomycota	Erysiphaceae	*Erysiphe betae* (Vaňha) Weltzien	po	[26]*
		Erysiphe cruciferarum Opiz ex L. Junell	p	[24]
			n/a	[182]
Oomycota	Albuginaceae	*Albugo candida* (Pers.) Kuntze	po	[202]
		Albugo lepidii A.N.S. Rao	po	[202]
	Peronosporaceae	*Peronospora lepidii-virginici* Gäum.	mo	[26]
		Peronospora parasitica (Pers.) de Bary	po	[202]
			po	[26]
Anamorphic *Guignardia*		*Phyllosticta lepidii* Brunaud	n/a	[182]

* Recorded as *Erysiphe polygoni* DC.

Arthropods

Order	Family	Species	H. R.	Ref.
Acariformes	Tetranychidae	Tetranychus urticae (Koch)	p	[168]
Coleoptera	Chrysomelidae	Phyllotreta turcmenica Weise	po	[91]
		Phyllotreta vittula (Redtenbacher)	po	[91]
	Curculionidae	Sympiezomias velatus (Chevrolat)	po	[191]
Hemiptera	Lygaeidae	NySius ericae (Schilling)	po	[124]
	Miridae	Adelphocoris lineolatus (Goeze)	p	[217]
	Pentatomidae	Eurydema maracandicum Oschanin	p	[217]I
		Eurydema ventrale Kolenati	p	[208]
		Eurydema wilkinsi Distant	p	[207]
Homoptera	Aphididae	Aphis gossypii Glover	po	[5]
Lepidoptera	Crambidae	Loxostege sticticalis L.	po	[119]
			p	[33]
	Noctuidae	Agrotis crassa (Hübner)	p	[131]
			p	[130]II
		Discestra trifolii (Hüfnagel)	po	[200]III
		Leucania zeae (Duponchel)	po	[10]
		Mamestra brassicae (L.)	p	[140]
	Pieridae	Pieris rapae (L.)	po	[198]
		Pieris canidia minima Verity	po	[102]
	Plutellidae	Plutella xylostella L.	po	[112]
Thysanoptera	Thripidae	Thrips tabaci Lindemann	po	[149]
			po	[66]

I Recorded as *Eurydema festiva chlorotica* Horváth

II Recorded as *Euxoa conspicua* Hübner

III Recorded as *Scotogramma trifolii* (Rottenberg)

Lygodium species
Climbing fern

Introduction
The genus *Lygodium* contains 45 species, most of which occur in tropical and subtropical regions. Ten species are reported to occur in China[152].

Species of *Lygodium* in China

Scientific Name	Scientific Name
L. conforme C. Chr.	*L. microstachyum* Desv.
L. digitatum Presl	*L. polystachyum* Wall.
L. flexuosum (L.) Sw.	*L. salicifolium* Presl
***L. japonicum* (Thunb.) Sw.**	*L. subareolatum* Christ
L. microphyllum* (Cav.) R. Br	*L. yunnanense* Ching

* Listed as *L. scandens* (L.) Sw. in several sources

I. *Lygodium japonicum*
Japanese climbing fern

Taxonomy
Order: Eufilicales
Family: Lygodiaceae
Genus: *Lygodium* Sw.
Species: *Lygodium japonicum* (Thunb.) Sw.

Description
Lygodium japonicum is a climbing fern reaching a height of 1-4 m. The numerous, opposite, compound leaves are 9-11 cm long. The petiole is 1.5 cm long and gray pubescent. The sterile leaves are triangular in overall outline, 10-12 in both length and width. The 2-4 pairs of pinnae (primary leaflets) are alternate on the stem that is about 4-8 mm, pubescent, and with narrow wings. Each pinna is ovoid, 4-8 cm long and 3-6 cm wide. The pinnules (primary leaflets) are 2-3 paired, alternate, nearly sessile, ovoid triangular, and palmately divided into 3 shortly broad lobes. The terminal lobe is 2-3 cm long and 6-8 mm wide, with an obtuse apex, subcordate base, and irregular crenulate margin. Fertile pinnae are ovoid triangular, about 10-20 cm in both length and width. The pinnae are 4-5 paired, alternate, oblong-lancelate, 5-10 cm in length and 4-6 cm in width. Each pinna has 3-4 pairs of ovoid triangular pinnatifid pinnules. Sporangia, borne along the margin in two rows, are glabrous, dark brown, and 2-4 mm in length[83, 180].

Habitat and Distribution
L. japonicum occurs along roadsides, forests, forest margins or thickets of hillside slopes, crop field margins, at elevations up to 1000m[83, 180]. It is a common component of the perennial plant population[204]. *L. japonicum* occurs primarily south of the Yangtze River in the provinces of Anhui, Fujian, Guangdong, Guizhou, Hunan, Guangxi, Jiangsu, northern Shaanxi, Taiwan, Yunnan, and Zhejiang [56, 117,152]. North of the Yangtze River, *L. japonicum*

occurs in thickets on the south slopes of the Qinling Mountains at elevations of 560-1100m [80] and the provinces of Gansu, Henan, and Shaanxi[80, 152]. This species may also occur in the southern Dabieshan Mountain area in Hubei province [31].

Economic Importance

L. japonicum is medicinally useful[83].

Related Species

L. microstachyum Desv., although similar to *L. japonicum* in appearance, has narrower and longer lobes, and occurs in thickets at elevations of 150 m in Fujian, Guangdong, Guangxi, Taiwan, and Yunnan provinces[152].

II. *Lygodium microphyllum* Old World climbing fern

Taxonomy

Order Eufilicales
Family Lygodiaceae
Genus *Lygodium* Sw.
Species *Lygodium microphyllum* (Cav.) R. Br. [= *Lygodium scandens* (L.) Sw.]

Description

Lygodium microphyllum is a fern that can climb up to a height of 7 m. Numerous papery pinnately compound leaves are borne on a short stem about 2-4 mm long, oppositely on the main stem with internode about 7-9 cm in length. The sterile leaves are imparipinnate (divergent lobed for the terminal leaflet), oblong, 7-8 cm long and 4-7 cm wide, opposite along the lower part of the stem, with petiole about 1-1.2 cm in length. Each sterile frond consists of about 4 pairs of pinnae (leaflets), which

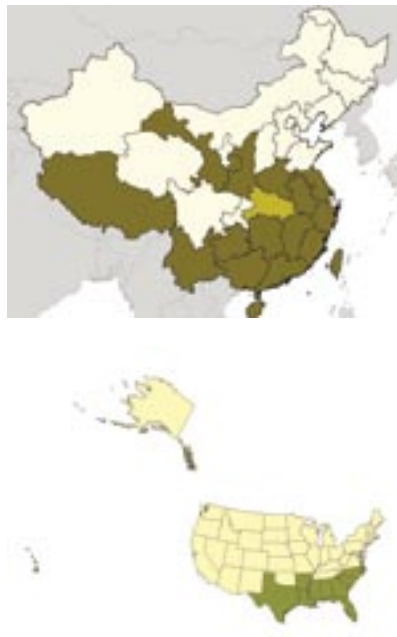
grow alternately 8 mm apart along the rachis. The leaflet is ovoid triangular, about 2 cm long and 1.5 cm wide, with a crenulate margin, truncate or subcordate base, and an obtuse apex. Fertile fronds are oblong, 8-10 cm long and 4-6 cm wide. Each frond has 4-5 pairs of leaflets that are triangular, 1.5-3 cm long and 1.5-2 cm wide, obtuse apically, with noticeable 2-3 branched leaf veins. Brown sporangia about 3-5 mm, occur along the margins of fertile pinnae[83, 180]

Habitat

L. microphyllum forms thickets, at elevations about 100-152 m. and also occurs along stream banks and roadsides where there is abundant sunshine. It is an indicator of acid soil, growing best at ph 4.5-5.0[83, 152, 180].

Distribution

L. microphyllum occurs in western Fujian, Guangdong, Guangxi, Hainan, Hunan, Jiangxi, Taiwan, and southeastern Yunnan provinces[117, 152].



Economic Importance

L. microphyllum is used medicinally in China[83].

Natural Enemies of *Lygodium*

Two fungi and seven arthropods are associated with the genus *Lygodium*. All can be hosted by *L. japonicum*[89].

Fungi

Phylum	Family	Species	H. R.	Ref.
Anamorphic *Mycosphaerella*		*Pseudocercospora lygodii* Sawada ex Goh & W.H. Hsieh	m	[129]
		Pseudocercospora polypodiacearum D.N. Shukla, A.K. Singh, P. Kumar & Kamal	m	[129]

Arthropods

Order	Family	Species	H. R.	Ref
Acariformes	***Eriophyidae***	*Floracarus perrepae* Knihinicki and Boczek	n/a‡	[89]
	Tenuipalpidae	*Brevipalpis* sp.	n/a†‡	[89]
Coleoptera	***Coccinellidae***	*Epilachna chinensis* (Weise)	p†	[75]
Homoptera	Margarodidae	*Icerya purchasi* Maskell	p†	[165]
Lepidoptera	Crambidae	*Neomusotima conspurcatalis* Warren	n/a‡	[89]
	Noctuidae	*Callopistria* sp.	n/a‡	[89]
Thysanoptera	Thripidae	*Octothrips lygodii* Mound	n/a‡	[89]

† Hosted by *L. japonicum*

‡ Hosted by *L. microphyllum*

Melia azedarach
Chinaberry tree

Introduction
The genus *Melia* contains three species that occur primarily in tropical and subtropical regions of the Eastern hemisphere. Two species have been recorded from China in provinces south the of Yellow River[7].

Species of *Melia* in China

Scientific Name
M. azedarach L.
M. toosendan Sieb. et Zucc.

Taxonomy
Order: Rutales
Suborder: Rutineae
Family: Meliaceae
Subfamily: Melioideae Harms
Tribe: Melieae Harms
Genus: *Melia* L.
Species: *Melia azedarach* L.

Description
Melia azedarach is a deciduous tree with spreading branches that can reach up to 10 m in height. The bark is grayish brown and longitudinally fissured. Leaves are odd bipinnate or tripinnate compounds, about 20-40 cm in length. Leaflets are opposite, ovate, elliptic to lanceolate, 3-7 cm long and 2-3 cm wide, shortly acuminate in the apex, cuneate or broadly so at the slightly asymmetrical base, with a crenulate serrate margin. The leaflets are covered with stellate hairs when young, becoming glabrescent with 12-16 pairs of ascending, spreading lateral veins. The panicles are about equal to the leaf in length, glabrous, glabrescent scaly or pubescent. Calyxes are five-lobed. Each lobe is ovate to oblong, with an acute apex. Petals are light purple, obovately spatulate, both surfaces are puberulous, and about 1 cm long. Stamens are monadelphous, purplish, glabrous or nearly so, 7-8 mm long, vertically striped, and 10 bi- or tri-denticulately lobed. Each lobe bears one anther on the inner wall. The ovary is subglobose, glabrous, containing 5-6 locules, with 2 ovules each. The fragrant flowers appear in April through May, the fruits, which are toxic, appear in October through September. They are globose to elliptic drupes 1-2 cm long and 8-15 mm wide, 4-5 locules, each containing a single seed[7].

Habitat
Melia azedarach occurs in low elevation open fields, roadsides, or sparse forests. Due to its high economic value, *M. azedarach* is cultivated in many areas. *M. azedarach* prefers a moist, fertile soil[7].

Distribution
M. azedarach has a wide distribution in provinces south of the Yellow River[7]. It has been reported from Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Yunnan, Zhejiang provinces and cultivated in Hebei.

Economic Importance
The sapwood of *M. azedarach* is used in building construction and furniture making. The fresh leaves are used as an insect repellant. The roots and fruit are medically useful[7].

Related Species
The other *Melia* species reported in China is *M. toosendan* Sieb. & Zucc. It has a 6-8 locule ovary, drupes about 3 cm long, and a nearly entire leaf margin. The inflorescence is half the length of the leaf. It prefers moist soil in the fertile mixed forests of Guizhou, Gansu, Hubei, Sichuan, and Yunnan[7].

Natural Enemies of *Melia*
Eight fungal species have been reported on members of the genus *Melia*, and seven on *M. azedarach*. *Melanconium meliae* Teng and *Cercospora meliae* Ellis & Everh. have only one host record. Fifty six species of arthropods have been

found on members of the genus *Melia*, mainly on *M. azedarach*. Among them, two monophagous leafhoppers *Elbelus melianus* Kuoh and *Erythroneura melia* Kuoh, cause significant damage[118, 203].

Fungi

Phylum	Family	Species	H. R.	Ref.
Ascomycota	Erysiphaceae	*Phyllactinia guttata* (Wallr.) Lév.	p	[26]I
Basidiomycota	Hymenochaetaceae	*Phellinus torulosus* (Pers.) Bourdot & Galzin	p	[26]
	Incertae sedis	*Phellinus williamsii* (Murrill) Pat.	p	[26]
	Polyporaceae	*Coriolus unicolor* (Bull.) Pat.	po	[26]
Anamorphic *Lewia*		*Alternaria tenuissima* (Kunze) Wiltshire	p	[209]
Anamorphic *Melanconis*		*Melanconium meliae* Teng	m	[26]
Anamorphic *Mycosphaerella*		*Cercospora meliae* Ellis & Everh.	m	[26]
		Pseudocercospora subsessilis (Syd. & P. Syd.) Deighton	o	[129]
			m	[26]II

[I]Recorded as *Phyllactinia corylea* (Pers.) Karst.
[II]Recorded as *Cercospora subsessilis* H. et P. Syd.

Arthropods

Order	**Family**	**Species**	**H. R.**	**Ref**
Acariformes	Eriophyidae	*Panonychus citri* (McGregor)	p	[75]
			p	[94]
	Tetranychidae	*Tetranychus* sp.	p	[75]
		Tetranychus urticae (Koch)	p	[94]
Coleoptera	Cerambycidae	*Anoplophora chinensis* (Förster)	p	[165]
			p	[94]
			p	[75]
		Anoplophora glabripennis (Motschulsky)	p	[94]
		Anoplophora horsfieldi (Hope)	p	[94]
		Batocera davidis Deyrolle	p	[94]
		Batocera lineolata Chevrolat	p	[94]
		Ceresium sinicum White	p	[94]
		Embrik-strandia unifasciata (Ritsema)	p	[94]
		Purpuricenus spectabilis Motschulsky	p	[94]
		Rhytidodera bowringii White	p	[94]
	Cetoniidae	*Cetonia pilifera* Motschulsky	p	[94]
	Curculionidae	*Chlorophanus auripes* Faust	p	[94]
	Eumolpidae	*Basilepta sinarum* Weise	p	[75]
	Melolonthidae	*Holotrichia diomphalia* Bates	p	[94]
		Holotrichia lata Brenske	p	[94]
		Holotrichia sinensis Hope	p	[94]
		Polyphylla laticollis Lewis	p	[94]
Hemiptera	Acanthosomatidae	*Elasmucha nipponica* (Esaki & Ishihara)	p	[208]
	Pentatomidae	*Chrysocoris grandis* (Thunberg)	p	[207]
			p	[94]
		Dalpada cinctipes Walker	p	[75]
		Plautia crossota (Dallas)	p	[75]
		Rhaphigaster genitalia (Fabricius)	p	[208]

Order	Family	Species	H. R.	Ref
Homoptera	Aleyrodidae	*Dialeurodes citri* (Ashmead)	p	[94]
	Cicadellidae	*Cicadula* sp.	m	[94]
		Elbelus melianus Kuoh	n/a	[203]
		Erythroneura melia Kuoh	m	[118]
			m	[94]
		Nephotettix cincticeps Uhler	m	[94]
	Cicadidae	*Cryptotympana atrata* (Fabricius)	p	[94]
	Coccidae	*Ceroplastes floridensis* Comstock	p	[173]
		Ceroplastes japonicus Green	p	[94]
	Diaspididae	*Lepidosaphes tubulorum* Ferris	p	[94]
		Parlatoria camelliae Comstock	p	[94]
	Fulgoridae	*Lycorma delicatula* (White)	p	[220]
			p	[94]
	Ricaniidae	*Ricania speculum* (Walker)	p	[220]
			p	[94]
Hymenoptera	Eurytomidae	*Eurytoma plotnikovi* Nikolskaya	p	[94]
Lepidoptera	Geometridae	*Ascotis selenaria dianaria* Hübner	p	[94]
		Ophthalmitis albosignaria (Bremer & Grey)	p	[189]I
	Hepialidae	*Phassus sinifer sinensis* Moore	p	[94]
	Limacodidae	*Monema flavescens* Walker	p	[75]
			p	[94]II
		Setora postornata (Hampson)	p	[94]
		Thosea sinensis (Walker)	p	[75]
			p	[94]
	Noctuidae	*Episparis liturata* (Fabricius)	m	[94]
		Grammodes geometrica (Fabricius)	p	[94]III
	Sphingidae	*Psilogramma increta* (Walker)	p	[94]
		Psilogramma menephron (Cramer)	p	[94]
	Tortricidae	*Enarmonia koenigana* Fabricius	m	[94]
Parasitiformes	Phytoseiidae	*Amblyseius okinawanus* Ehara	p	[75]
		Amblyseius orientalis Ehara	p	[75]
		Euseius ovalis (Evans)	p	[75]
Thysanoptera	Phlaeothripidae	*Haplothrips chinensis* Priesner	p	[75]
			p	[94]
	Thripidae	*Scirtothrips dorsalis* Hood	p	[66]
		Thrips coloratus Schmutz	p	[75]
		Thrips flavidulus Bagnall	p	[75]
		Thrips formosanus Priesner	po	[66]

[I]Recorded as *Ophthalmodes albosignaria* (Bremer et Grey)
[II]Recorded as *Cnidocampa flavescens* (Walker)
[III]Recorded as *Chalciope geometrica* Fabricius

Miscanthus sinensis
Chinese silver grass

Introduction
The genus *Miscanthus* contains approximately ten species occurring primarily in southeastern Asia and occasionally Africa. Six species have been reported from China[121].

Taxonomy
Order: Graminales
Suborder: Gramineae
Family: Gramineae (Poaceae)
Subfamily: Panicoideae A. Br.
Tribe: Andropogoneae Dumort.
Subtribe: Saccharinae Griseb.
Genus: *Miscanthus* Anderss.
Species: *Miscanthus sinensis* Anderss.

Species of *Miscanthus* in China

Scientific Name	Scientific Name
M. flavidus Honda	*M. purpurascens* Anderss.
M. floridulus (Lab.) Warb. ex Schum. et Laut.	***M. sinensis* Anderss.**
M. jinxianensis L. Liu	*M. transmorrisonensis* Hayata

Description
Miscanthus sinensis is a reed-like clumping perennial grass. The culms, about 1-2 m tall, are glabrous, or pilose below the inflorescences. The glabrous leaf sheath is longer than the internode. Ligule is membranous, obtuse, 1-3 mm long, with tiny cilia at the tip. The leaf is linear, pilose or farinose on the underside, 20-50 cm long and 6-10 mm wide with a coarse margin. The erect panicles can reach 15-40 mm in length, glabrous along the rachis but pubescent in the node and axils. The erect branches are triangular, about 10 to 30 cm long with 2 to 6 long stalks. The shiny yellowish spikelet is lanceolate, 4.5 to 5 mm long, and no longer than the white or light yellow filaceous hairs at the base of the glume. The lower glume is acuminate, 3 to 4 veined and rough along the lateral vein, whereas the upper glume is single veined and ciliated along both sides of the involute margin. Noticeably shorter than the lower lemma, which is oblong, membranous, about 4 mm in length and ciliated, the upper lemma is 2-lobed. Between the lobes is a single, bent, brown awn 9 to 10 mm long. The pinkish color of the flowers can be attributed to the -purplish brown anthers that are 2.2 to 2.5 mm long. The pistils have purplish brown pinnate stigmas. The fruit is an oblong, dark purple caryopsis[121].

Habitat
M. sinensis occurs in mountainous areas, highlands, and wastelands in the plains at elevations below 1800 m[121].

Distribution
M. sinensis has been reported from the provinces of Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hunan, Jiangsu, Jiangxi, Sichuan, Taiwan, Yunnan, and Zhejiang[19, 30, 53, 105, 121].

Economic Importance
The fibers of *Miscanthus sinensis* are useful for many purposes including papermaking[121].

Related Species
Miscanthus jinxianensis L. Liu is morphologically similar to *M. sinensis*. However, *M. jinxianensis* has fewer inflorescences and larger spikelets measuring about 6-7.5 mm in length[121].

Natural Enemies of *Miscanthus*
Nineteen fungal species and 18 arthropods are reported from the plants of genus *Miscanthus*. Ten fungi are reportedly hosted by *M. sinensis*.

Fungi

Phylum	Family	Species	H. R.	Ref.
Ascomycota	Chaetothyriaceae	*Chaetothyrium javanicum* (Zimm.) Boedijn	po	[26]
	Clavicipitaceae	*Balansia claviceps* Speg.	m	[26]*
	Dothioraceae	*Metasphaeria miscanthi* Sawada	mo	[26]

Phylum	Family	Species	H. R.	Ref.
	Erysiphaceae	*Balansia andropogonis* Syd. & E.J. Butler	po	[26]
		Claviceps purpurea (Fr.) Tul.	p	[26]
	Meliolaceae	*Meliola andropogonis* F. Stevens & A. Roldán	mo	[26]
		Meliola boedijniana Hansf.	o	[73]
		Meliola panici Earle	p	[73]
			po	[26]
		Meliola setariae Hansf. & Deighton	po	[73]
	Phyllachoraceae	*Phyllachora graminis* var. *graminis* (Pers.) Fuckelel	p	[26]
		Phyllachora miscanthi Syd. & P. Syd.	o	[26]
Basidiomycota	Pucciniaceae	*Puccinia erythropus* Dietel	p	[170]
		Puccinia melanocephala Syd. & P. Syd.	p	[170]
		Puccinia miscanthi Miura	p	[170]
		Puccinia miscanthicola F.L. Tai & Cheo	mo	[170]
		Ustilago kusanoi Syd. & P. Syd.	p	[72]
	Ustilaginaceae	*Sporisorium miscanthi* (W.Y. Yen) L. Guo	mo	[72]
Oomycota	Sclerosporaceae	*Peronosclerospora miscanthi* (T. Miyake) C.G. Shaw	po	[202]
		Sclerospora mischanthi Miyake	po	[26]

* Recorded as *Phaeosaccardinula javanica* (Zimm.) Yamam.

Arthropods

Order	Family	Species	H. R.	Ref
Coleoptera	Eumolpidae	*Smaragdina mandzhura* (Jacobson)	po	[164]
Homoptera	Hormaphididae	*Ceratovacuna lanigera* Zehntner	po	[205]
			po	[165]
	Tropiduchidae	*Catullia vittata* Matsumura	po	[220]
			po	[178]
Lepidoptera	Hesperiidae	*Aeromachus inachus* Ménétriès	m	[178]
		Astictopterus jama chinensis (Leech)	m	[178]
		Borbo cinnara (Wallace)	po	[178]
		Isoteinon lamprospilus Felder & Felder	po	[178]
		Ochlodes venata Bremer & Grey	po	[178]
		Parnara ganga Evansman	po	[178]
		Polytremis pellucida (Murray)	po	[178]
		Polytremis zina (Eversman)	po	[178]
	Satyridae	*Lethe insana* Kollar	oo	[178]
		Melaritis leda (L.)	po	[178]
		Mycalesis francisca (Stoll)	po	[178]
		Mycalesis sangaica Butler	po	[178]
Thysanoptera	Phlaeothripidae	*Ophthalmothrips miscanthicola* (Haga)	m	[66]
	Thripidae	*Stenchaetothrips cymbopogoni* Zhang & Tong	po	[66]
		Thrips flavidulus Bagnall	po	[66]

Murdannia keisak
Wart removing herb

Introduction
Forty members of the genus *Murdannia* occur in tropical and subtropical regions worldwide. In China, 20 species have been recorded, most of which occur south of the Yangtze River [69].

Species of *Murdannia* in China

Scientific Name	Scientific Name
M. bracteata (C. B. Clarke) J. K. Morton ex Hong	*M. medica* (Lour.) Hong
M. citrina D. Fang	*M. nudiflora* (L.) Brenan
M. divergens (C. B. Clarke) Brückn.	*M. simplex* (Vahl) Brenan
M. edulis (Stokes) Faden	*M. spectabilis* (Kurz) Faden
M. hookeri (C. B. Clark.) Brückn.	*M. spirata* (L.) Brückn
M. japonica (Thunb.) Faden	*M. stenothyrsa* (Diels) Hand. -Mazz.
M. kainantensis (Masam.) Hong	*M. triquetra* (Wall.) Brückn.
***M. keisak* (Hassk.) Hand. -Mazz.**	*M. undulata* Hong
M. loriformis (Hassk.) Rolla Rao et Kammathy	*M. vaginata* (L.) Brückn.
M. macrocarpa Hong	*M. yunnanensis* Hong

Taxonomy
Order: Commelinales
Suborder: Commelinineae
Family: Commelinaceae
Genus: *Murdannia* Royle
Section: Pauciflorae Brückn
Species: *Murdannia keisak* (Hassk.) Hand.-Mazz.

Description
Murdannia keisak is a glabrous perennial herb that has fibrous, horizontal, elongate rhizomes. The decumbent stems are 40 cm in length. Internodes are 8 cm long, and have densely, white hairs. Leaves are sessile, spreading or slightly folded, linear-lanceolate or linear-elliptic, 2-8 cm long and 5-8 mm wide, acuminate apex, with a ciliate base extending by a line of hairs on the leaf sheath. A solitary flower appears in the axil or terminally on the peduncle 1-4 cm long. The linear bract is situated in the middle of the peduncle. Sepals are narrowly oblong, 6-10 mm in length. The obovate petals are pink, purplish red, blue-purple, or grayish blue. Filaments are covered with dense, long hairs. Capsules are narrowly ovoid, trigonous, 5-10 mm long and 2-3 mm wide, acute to nearly acuminate at both ends. There are 4 uniseriate, gray, slightly flattened seeds per valve. Flowers appear August through September.[70].

Habitat
M. keisak prefers wet places such as ditch sides, flooded paddy field margins and shaded areas along roadsides[110, 115, 145].

Distribution
M. keisak distribution includes southern Fujian, northern Jiangxi, eastern Jilin, Liaoning, and northeastern Zhejiang, also Anhui[38], Guizhou[110], Heilongjiang[223], Henan[30], Hubei[53], Hunan, Jilin[223] provinces, and Taiwan[77].

Economic Importance
M. keisak is a common weed of paddy fields. Occurrence is sparse. The stems and leaves can be used as livestock forage[7].

Related Species
M. triquetra (Wall.) Brückn., shares similar habitat, appearance and distribution to *M. keisaki,* however, it has a long ellipsoid, trigonous capsule 8-10 mm long and 2-3 mm wide, and acute at both ends[69, 70].

Natural Enemies of *Murdannia*
At least one fungal species is associated with the genus *Murdannia*.

Fungi

Phylum	Family	Species	H. R.	Ref.
Basidiomycota	Pucciniaceae	*Puccinia adhikarii* Ono	po	[170]

Phalaris arundinacea
Reed canary grass

Introduction
The genus *Phalaris* contains 10 species that occur in the temperate regions of the Northern hemisphere, primarily in Europe and North America. Only one species and one variety has been recorded in China[162].

Species of *Phalaris* in China
Phalaris arundinacea L.

Taxonomy
Order: Graminales
Suborder: Gramineae
Family: Gramineae (Poaceae)
Subfamily: Pooideae
Tribe: Phalarideae Kunth
Genus: *Phalaris* L.
Species: *Phalaris arundinacea* L.

Description
Phalaris arundinacea is a rhizomatous perennial grass. The 6-8 noded culm grows solitarily or rarely in a clump about 60-140 cm tall. The glabrous leaf sheath is shorter than the internode. The ligule is 2-3mm long and membranous. Leaves are flat, slightly coarse when young, 6-30 cm long and 1-1.8 cm wide. Panicle is narrowly dense and 8-15 cm high, with erect branches. The spikelets, are 4-5 mm long and glabrous or slightly hairy. On the glume's keel is a narrow wing. The infertile lemma is broadly lanceolate, 3-4 mm long and pubescent; while the two degenerated fertile lemmae are linear and pubescent. The boat-shaped palea has one keel along which run pilose hairs. The anther is 2-2.5 mm long. The flowers and fruit appear in June through August[162].

Habitat
P. arundinacea occurs in forests and moist grasslands at elevations of 75-3200 m[162].

Distribution
P. arundinacea has been reported from Gansu, Hebei, Hunan, Heilongjiang, Inner Mongolia, Jiangsu, Jiangxi, Jilin, Liaoning, Shaanxi, Shandong, Shanxi, Sichuan and Zhejiang provinces[23, 30, 53, 77, 126, 142, 162].

Economic Importance
The young plants of *P. arundinacea* are favorite forage of poultry. The culms can be used for papermaking[162].

Related Species
P. arundinacea var. *picta* L. can be distinguished from *Phalaris arundinacea* var. *arundinacea* by its flat leaf and the white stripe embossed in the white leaf[162].

Natural Enemies of *Phalaris*
One fungal species has been found on the single member of the genus *Phalaris*.

Fungi

Phylum	Family	Species	H. R.	Ref.
Basidiomycota	Pucciniaceae	*Puccinia sessilis* W.G. Schneid.	p	[26]

Phleum pratense
Timothy

Introduction
The genus *Phleum* is comprised of approximately fifteen species with distribution in the cold temperate regions of both hemispheres. In China, four species have been reported. Most members of the genus are components of high-quality pastures and hay fields[125].

Species of *Phleum* in China

Scientific Name
P. alpinum L.
P. paniculatum Huds.
P. phleoides (L.) Karst.
***P. pratense* L.**

Taxonomy
Order: Graminales
Suborder: Gramineae
Family: Gramineae (Poaceae)
Subfamily: Pooideae
Tribe: Agrostideae Dumort.
Genus: *Phleum* L.
Species: *Phleum pratense* L.

Description
Phleum pratense is a perennial grass with densely fibrous roots and short rhizomes. The erect culm, 40-120 cm in height with 5-6 nodes, rises from the bulbous base and the persistent leaf sheath. The glabrous leaf sheath is shorter than the internode except near the base where it is longer. Ligule is membranous, 2-5 mm long. Leaf blade is flat, coarse on upper and lower surfaces and along the margin, 10-30 cm long and 3-8 mm wide. The panicle is cylindrical, grayish green, 4-15 cm long and 5-6 mm wide. Spikelets are oblong. The glume is membranous, 3 mm long with 3 vertical veins edged with stiff hairs and truncate apex. Awn is 0.5-1 mm long. Slightly longer than the palea, the lemma is membranous, 2 mm long, with 7 veins covered with minute hairs. The anther is 1.5 mm long. The flower and fruits appear summer through autumn[4].

Habitat
P. pratense occurs in broadleaf forests, forest margins, valley grasslands and prairie in the moist regions of the Tian Shan range and western Dzungarian mountain area of Xinjiang, at elevations of 1100-2200 m[23, 125]. Many provinces have introduced the plant. In Shandong province, the species is suspected to have escaped cultivation[9].

Distribution
P. pratense is native to Zhaosu and Xinjiang provinces. It has been introduced as a forage plant into many other provinces.
Economic Importance
The species is regarded as a high quality forage plant

Natural Enemies of *Phleum*
Two species of fungi and two arthropods are reportedly associated with the genus *Phleum*.

Fungi

Phylum	Family	Species	H. R.	Ref.
Ascomycota	Pleosporaceae	*Pyrenophora dictyoides* A.R. Paul & Parbery	m	[26]*
Oomycota	Peronosporaceae	*Ustilago striiformis* (Westend.) Niessl	p	[26]

*Recorded as *Helminthosporium dictyoides* Drechsler

Arthropods

Order	Family	Species	H. R.	Ref
Coleoptera	Crioceridae	*Oulema oryzae* (Kuwayama)	po	[164]
			p	[164]
Lepidoptera	Tortricidae	*Aphelia paleana* (Hübner)	po	[133]

Phragmites australis
Common reed

Introduction
The genus *Phragmites* contains 10 species worldwide. Three members of the genus have been reported from China[123].

Species of *Phragmites* in China

Scientific Name
P. australis (Cav.) Trin. ex Steud.
P. japonica Steud,
P. karka (Retz.) Trin.

Taxonomy
Order: Graminales
Suborder: Gramineae
Family: Gramineae (Poaceae)
Subfamily: Arundioideae
Tribe: Arundineae
Subtribe: Arundinae Bews
Genus: *Phragmites* Trinius
Species: *Phragmites australis* (Cav.) Trin. ex Steud. [=*Phragmites communis* Trin.]

Description
Phragmites australis is a perennial grass with stoloniferous rhizomes. The erect culm reaches a height of 8 m and a diameter of 1-4 cm. Below each node may be some white powdery substances. The leaf blade is flat, 15-45 cm long and 1-3.5 cm wide with a smooth or coarse margin. The ligule is very short, truncate or appears as a ciliate ring, while the leaf sheath is glabrous or minutely hairy. Panicles are about 10-40 cm long, slightly nodding with slightly spreading branchlets that are 12-16 mm long and mostly bear 4-7 florets, which maybe male for the first one from the base. The glumes are 3-veined, 3-7 mm long for the first glume and 5-11 mm for the second glume. The flowers appear from July to November[58, 68, 81, 84, 87, 123].

Habitat
P. australis occurs at the edge of rivers, lakes, swamps, moist areas, and wetlands at lower elevations[58, 84, 123].

Distribution
P. australis has a nationwide distribution in China[123].

Economic Importance
Young plants of *P. australis* are rich in proteins and saccharides, and are therefore favored as cattle and horse feed. As it matures, the lignified plant cannot be used as forage. However, the mature culms can be used for construction and paper making[58, 123].

Related Species
P. karka (Retz.) Trin. has comparatively larger panicles and numerous spreading branches. It occurs in Guangdong, Guangxi, Guizhou, Hainan, Sichuan, Taiwan and Yunnan provinces[123].

Natural Enemies of *Phragmites*
Twenty four species of fungi and 117 species of arthropods have been recorded as associated with the genus *Phragmites*.

Fungi

Phylum	Family	Species	H. R.	Ref.
Ascomycota	Apiosporaceae	Apiospora montagnei Sacc.	m	[26]I
	Dothideaceae	Scirrhia rimosa (Alb. & Schwein.) Fuckelel	m	[26]II
	Incertae sedis	Massariothea botulispora (Teng) B. Sutton	m	[26]III
	Meliolaceae	Meliola arundinis Pat.	p	[73]
			o	[26]
	Phyllachoraceae	Phyllachora arundinis Sawada	mo	[26]IV
Basidiomycota	Pucciniaceae	Puccinia abei Hirats.	mo	[170]
			mo	[26]
		Puccinia invenusta Syd.	oo	[170]
			mo	[26]
		Puccinia isiacae (Thüm.) G. Winter	mo	[170]
		Puccinia longinqua Cummins	o	[170]
			o	[26]
		Puccinia magnusiana Körn.	o	[170]
			p	[26]
		Puccinia moriokaensis S. Ito	m	[170]
			o	[26]
		Puccinia okatamaensis S. Ito	m	[170]
			o	[26]
		Puccinia phragmitis (Schumach.) Körn.	p	[170]
			m	[26]
		Puccinia sinkiangensis Y.C. Wang	m	[170]
			m	[26]
	Ustilaginaceae	Ustilago grandis Fr.	m	[64]
			m	[26]
		Ustilago himalensis (Kakish. & Y. Ono) Vánky & Oberw.	mo	[64]
		Ustilago phragmitis L. Ling	m	[64]V
			m	[26]
Anamorphic Ascomycetes		Brachysporium phragmitis Miyake	m	[26]
		Deightoniella arundinacea (Corda) S. Hughes	m	[26]VI
Anamorphic Lewia		Alternaria tenuissima (Kunze) Wiltshire	p	[209]
Anamorphic Mycosphaerella		Cladosporium arundinis (Corda) Sacc.	m	[210]
		Cladosporium cladosporioides (Fresen.) G.A. de Vries	p	[210]
Anamorphic Uredinales		Uredo phragmitis-karkae	mo	[26]
Anamorphic Xylariales		Hadrotrichum phragmiticola Teng	m	[26]

[I]Recorded as *Coniosporium arundinis* (Corda) Sacc.
[II]Recorded as *Hadrotrichum phragmitis* Fuckel
[III]Recorded as *Hendersonia botulispora* Teng
[IV]Recorded as *Phyllachora phragmitis-karkae* Saw
[V]Recorded as *Ustilago phragmites* Ling
[VI]Recorded as *Napicladium arundinaceum* (Corda) Sacc.

Arthropods

Order	Family	Species	H. R.	Ref.
Acariformes	Eriophyidae	Parategonotus phragmitae Kuang	m	[90]
	Tetranychidae	Petrobia latens (Müller)	p	[167]
Coleoptera	Anthribidae	Phloeobius sp.	p	[94]I
	Cerambycidae	Dorysthenes hydropicus Pascoe	p	[94]
	Cetoniidae	Protaetia brevitarsis (Lewis)	p	[94]II
	Chrysomelidae	Psylliodes reitteri Weise	m	[201]
		Sphaeroderma apicale Baly	p	[201]
	Crioceridae	Donacia clavipes Fabricius	m	[164]
		Donacia provosti Fairmaire	p	[75]
		Donacia vulgaris Zschach	m	[164]
		Oulema oryzae (Kuwayama)	p	[164]
			p	[94]
	Curculionidae	Tanymecus circumdatus Wiedemann	p	[94]
	Hispidae	Dicladispa armigera (Olivier)	p	[94]
			p	[94]III
		Hispellinus moerens (Baly)	p	[94]
	Melolonthidae	Holotrichia oblita Feldermann	p	[94]
		Holotrichia parallela Motschulsky	p	[94]
		Holotrichia trichophora (Fairmaire)	p	[94]IV
	Rutelidae	Adoretus sinicus Burmeister	p	[94]
		Adoretus tenuimaculatus Waterhouse	p	[94]
		Anomala corpulenta Motschulsky	p	[94]
		Anomala cupripes Hope	p	[94]
		Anomala heydeni Frivaldszky	p	[94]
Diptera	Cecidomyiidae	Giraudiella sp.	p	[94]
Hemiptera	Coreidae	Aeschyntelus chinensis Dallas	p	[94]
		Cletus punctiger Dallas	p	[94]
		Leptocorisa varicornis (Fabricius)	p	[94]
	Lygaeidae	Dimorphopterus spinolae (Signoret)	p	[94]
	Miridae	Adelphocoris fasiaticollis Reuter	p	[94]
		Trigonotylus ruficonis Geoffroy	p	[207]
	Pentatomidae	Metonymia glandulosa (Wolff)	p	[207]
		Scotinophara lurida (Burmeister)	p	[94]
		Stollia guttiger (Thunberg)	p	[94]
	Pyrrhocoridae	Pyrrhocoris tibialis Stål	p	[207]
Homoptera	Aclerdidae	Nipponaclerda biwakoensis (Kuwana)	p	[173]
			p	[94]
	Aphididae	Hyalopterus amygdali Blanchard	p	[94]
			p	[205]V
			p	[165]
		Macrosiphum avenae Fabricius	p	[94]

Order	Family	Species	H. R.	Ref.
		Melanaphis sacchari (Zehntner)	p	[94]VI
			p	[113]
		Rhopalosiphum padi (L.)	p	[94]
		Rhopalosiphum rufiabdominalis (Sasaki)	p	[205]
	Cercopidae	Callitettix versicolor Fabricius	p	[94]
	Cicadellidae	Cicadula fasciifrons Stål	p	[94]
		Deltocephalus dorsalis (Motschulsky)	p	[94]VII
		Deltocephalus oryzae Matsumura	p	[94]
		Erythroneura limbata (Matsumura)	p	[94]
		Erythroneura maculifrons (Motschulsky)	p	[94]
		Erythroneura subrufa (Motschulsky)	p	[94]
		Nephotettix cincticeps Uhler	p	[94]
		Nephotettix virescens Distant	p	[94]
		Tettigoniella viridis (L.)	p	[94]VIII
	Cixiidae	Oliarus apicalis (Uhler)	p	[94]
	Delphacidae	Chloriona tateyamana Matsumura	p	[94]
		Dicranotropis nagaragawana Matsumura	p	[94]
		Laodelphax striatellus (Fallén)	p	[94]
		Perkinsiella saccharicida Kirkaldy	p	[94]
		Saccharosydne procerus (Matsumura)	p	[94]
		Sogatella furcifera (Horváth)	p	[94]
		Toya propingua neopropingua (Muir)	p	[94]
		Unkanodes sapporona Matsumura	p	[94]
	Dictyopharidae	Dictyophara sinica Walker	p	[94]
	Eriococcidae	Rhizococcus trispinatus (Wang)	m	[172]IX
			p	[94]X
	Pseudococcidae	Cannococcus ostiolata (Borchsenius)	o	[172]XI
		Liucoccus ehrhornioides Borchsenius	p	[172]
Hymenoptera	Tenthredinidae	Dolerus tritici Chu	p	[94]
Lepidoptera	Arctiidae	Aloa lactinea (Cramer)	p	[94]XII
		Creatonotos tranciens (Walker)	p	[94]XIII
		Spilosoma lubricipedum (L.)	p	[94]XIV
	Cossidae	Phragmataecia castaneae Hübner	p	[178]XV
			p	[94]
			m	[25]
	Crambidae	Calamochrous acutellus Eversmann	m	[169]
			p	[94]
		Chilo hyrax Bleszynski	p	[94]
		Chilo luteellus (Motschulsky)	m	[169]
			p	[94]
			m	[25]
		Chilo phragmitellus Hübner	p	[94]

Order	Family	Species	H. R.	Ref.
		Chilo suppressalis (Walker)	p	[169]
		Ostrinia nubilalis (Hübner)	p	[169]
		Schoenobius gigantellus Denis & Schiffermüller	m	[169]
	Hesperiidae	Parnara ganga Evansman	p	[178]
		Parnara guttata Bremer & Grey	p	[94]
		Polytremis zina (Eversman)	p	[178]
	Lymantriidae	Cifuna locuples Walker	p	[212]
			p	[94]
			p	[75]
			p	[166]
		Laelia coenosa candioda Leech	p	[94]XVI
	Noctuidae	Agrotis ipsilon (Hüfnagel)	p	[94]XVII
		Aletia pudorina (Denis & Schiffermüller)	p	[25]XVIII
		Archanara neurica (Hübner)	m	[15]
		Archanara phragmiticola Staudinger	p	[94]XIX
		Leucania insecuta Walker	p	[94]
		Leucania loreyi (Duponchel)	p	[94]
		Leucania venalba Moore	p	[94]
		Rhizedra lutosa (Hübner)	m	[15]
		Senta flammea (Curtis)	p	[15]
		Sesamia inferens (Walker)	p	[224]
			p	[94]
			p	[178]
		Sesamia vuteria (Stoll)	p	[224]XX
		Spodoptera depravata Butler	p	[75]XXI
			p	[166]XXII
		Spodoptera litura (Fabricius)	p	[94]
	Psychidae	Clania minuscula Butler	p	[78]XXIII
	Pyralidae	Proceras venosatum (Walker)	p	[94]XXIV
	Satyridae	Coenonympha oedippus (Fabricius)	p	[219]
Orthoptera	Acrididae	Acrida cinerea (Thunberg)	p	[94]XXV
			p	[94]
	Catantopidae	Chondracris rasea De Geer	p	[94]
		Hieroglyphus annulicornis (Shiraki)	p	[94]
		Oxya chinensis (Thunberg)	p	[94]
		Patanga japonica (I. Bolivar)	p	[94]
		Shirakiacris shirakii (I. Bolivar)	p	[94]XXVI
	Conocephalidae	Conocephalus gladiatus Redtenbacher	p	[94]
		Homorocoryphus lineosus Walker	p	[94]
	Gryllidae	Teleogryllus mitratus Burmeister	p	[94]XXVII
	Oedipodidae	Aiolopus tamulus (Fabricius)	p	[94]
		Gastrimargus marmoratus (Thunberg)	p	[94]

Order	Family	Species	H. R.	Ref.
		Locusta migratoria manilensis (Mayen)	p	[94]
		Oedaleus infernalis Saussure	p	[94]
	Phaneropteridae	Ducetia japonica (Thunberg)	p	[94]
	Pyrgomorphidae	Atractomorpha lata (Motschulsky)	p	[94]
		Atractomorpha sinensis I. Bolivar	p	[94]
Thysanoptera	Phlaeothripidae	Haplothrips aculeatus (Fabricius)	p	[66]
			p	[94]
		Haplothrips tritici (Kurdjumov)	p	[66]
	Thripidae	Frankliniella intonsa (Trybom)	p	[94]
		Scirtothrips dorsalis Hood	p	[66]
		Stenchaetothrips bambusae (Shumsher Singh)	p	[66]
		Stenchaetothrips biformis (Bagnall)	p	[66]
			p	[75]
			p	[94]

[I]Probably *Phloeobius triarrhenus* Zhang
[II]Recorded as *Potosia brevitarsis* Lewis
[III]Also recorded as *Hispa armigera* Olivier
[IV]Recorded as *Pledina trichophora* Fairmaire
[V]Recorded as *Hyaloptera amygdali* Blanchard
[VI]Recorded as *Longiunguis sacchari* Zehntner
[VII]Recorded as *Inazuma dorsalis* Motschulsky
[VIII]Recorded as *Tettigella viridis* Linné
[IX, X]Recorded as *Eriococcus trispinatus* Wang
[XI]Recorded as *Kiritshenkella ostiolata* (Borchs)
[XII]Recorded as *Amsacta lactinea* Cramer
[XIII]Recorded as *Creatonotus tranciens* Walker
[XIV]Recorded as *Spilosoma menthastri* Esper
[XV]Recorded as *Phragmataecia castanea* Hübner
[XVI]Probably *Laelia coenosa* (Hübner)
[XVII]Recorded as *Agrotis ypsilon* Rottemberg
[XVIII]Recorded as *Leucania pudorina* Schiffermuller
[XIX]Recorded as *Agrotis phragmiticola* Staudinger
[XX]Probably *Sesamia uniformis* (Dudgeon)
[XXI, XXII]Recorded as *Sidemia depravata* (Butler)
[XXIII]Recorded as *Clania minuscular* Snellen
[XXIV]Recorded as *Procera venosatum* Walker
[XXV]Also recorded as *Acrida chinensis* Westwood
[XXV]Recorded as *Eupreoocnemis shirakii* Bolivor
[XXVII]Recorded as *Gryllus testaceus* Walker

Polygonum perfoliatum
Mile-a-minute

Introduction
The genus *Polygonum* is comprised of 230 species worldwide, primarily in the northern temperate regions of the world. In China, 113 species and 26 varieties have been reported from all provinces of the country[99].

Taxonomy
Order: Polygonales
Family: Polygonaceae
Subfamily: Polygonideae
Tribe: Polygoneae
Genus: *Polygonum* L.
Section: Echinocaulon Meisn.
Species: *Polygonum perfoliatum* L.

Description
Polygonum perfoliatum is an annual vine that can reach 1-2 m or more in length. The stems are furrowed with short recurved prickles along the ridges. Nearly as long as the petiole, the thin, papery leaves are triangular, about 3-7 cm long and 2-5 cm wide, glabrous on the upper surface with prickles along the mid-rib on the underside. The saucer-shaped ochrea (stipule sheath) is green and connate perfoliate with a diameter of 1.5-3 cm. The flowers, 1-3 cm in length, are borne on racemes that emerge from the leaf axil or at the end of the stem in June through August. Bracts are ovoid, each containing 2-4 flowers with 8 stamens and 3 styles. The perianth consisting of 5 deep lobes, is white or light red in color, becoming blue at fruiting in July to October. Each shiny, black achene is globose, 3-4 mm in diameter, and contained in a persistent perianth[95, 99].

Habitat
P. perfoliatum occurs in moist areas at elevations of 80 – 2300 m. *P. perfoliatum* can be found along rivers and roadsides in eastern China[[128]]; along valley streams and in thickets in northern China[17, 67]; mountain thickets, forest margins and stream banks at elevations of 200 – 1300 m in the the Qinling Mountains and Loess Plateau areas of northwestern China[48, 79]; ditches, stream banks and wasteland in central and southern China[88, 120, 180]; hillside thickets at 2100m in southern Tibet[184]; and grassy slopes, forest margins, roadsides and river banks at 500 – 2100 m in Yunnan, southwestern China[2].

Distribution
P. perfoliatum occurs in the provinces of Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Heilongjiang, Henan, Hubei, Hunan, eastern Inner Mongolia, Jiangsu, Jiangxi, Jilin, Liaoning, southern Shaanxi, Shandong, Sichuan, Taiwan, Chayu of southern Tibet, Yunnan, Zhejiang, and possibly eastern Gansu[95, 99, 128, 184].

Economic Importance
Polygonum perfoliatum is traditionally regarded as medicinally useful in China, and it is also utililized for suppressing vegetable insect pests[95, 120]

Related Species
P. thunbergii Sieb. et Zucc. has hastate leaves, occurs in wet valleys and on grassy slopes, at elevations of 90-2400 m. Its distribution includes Gansu, Guizhou, Shaanxi, Sichuan, Yunnan provinces. [95].

Natural Enemies of *Polygonum*
Seventy one species of fungi have been reported as associated with various *Polygonum* species, of which 2 are associated with *P. perfoliatum*. The taxonomic status of *Puccinia* spp. on members of the Polygonaceae in China was reviewed in the1980s[101]. The 30 reported species are included in the second flora on *Puccinia*[229]. Sixty-six arthropods have been

reported as associated with members of the genus *Polygonum*. One hundred eleven arthropod species were found during a survey to identify potential biological control agents against *P. perfoliatum*. More than half are Coleopteran species, with one weevil species, *Rhinoncomimus latipes* Korotyaev (Coleoptera: Curculionidae), regarded as the most promising agent. In addition, 3 oligophagous leaf beetles, *Smaragdina nigrifrons* (Coleoptera: Eumolpidae), *Gallerucida bifasciata* and *Galerucella placida* (Coleoptera: Chrysomelidae), were dominant at most of the surveyed sites as well as *Timandra griseata* (Lepidoptera: Geometridae), a geometrid moth. One bug, *Cletus schmidti* (Hemiptera: Coreidae), and one sawfly, *Allantus nigrocaeruleus* (Hymenoptera: Tenthredinidae), were recommended for further host specificity evaluations[32].

Species of *Polygonum* in China[95, 99]

Scientific Name	Scientific Name
P. acerosum Ledeb. ex Meisn.	*P. macrophyllum* D. Don
P. acetosum Bieb.	*P. manshuriense* V. Petr. ex Kom.
P. affine D. Don	*P. microcephalum* D. Don
P. ajanense (Regel et Til.) Grig.	*P. milletii* (Lévl.) Lévl.
P. alopecuroides Turcz. ex Besser	*P. molle* D. Don
P. alpinum All.	*P. molliiforme* Boiss.
P. amphibium L.	*P. muricatum* Meisn.
P. amplexicaule D. Don	*P. nepalense* Meisn.
P. angustifolium Pall.	*P. nummulariifolium* Meisn.[IV]
P. arenastrum Boreau	*P. ochotense* V. Petr. ex Kom.
P. argyrocoleon Steud. ex Kuntze[I]	*P. ochreatum* L.
P. assamicum Meisn.	*P. orientale* L.
P. aviculare L.	*P. pacificum* V. Petr. ex Kom.
P. barbatum L.	*P. paleaceum* Wall. ex Hook. f.
P. biconvexum Hayata	*P. palmatum* Dunn
P. bistorta L.	*P. paralimicola* A. J. Li
P. bungeanum Turcz.	*P. paronychioides* C. A. Mey. ex Hohen.
P. campanulatum Hook. f.	*P. patulum* Bieb.
P. capitatum Buch.-Ham. ex D. Don	*P. perfoliatum* L.
P. cathayanum A. J. Li	*P. persicaria* L.
P. chinense L.	*P. pinetorum* Hemsl.
P. cognatum Meisn.	*P. platyphyllum* Li et Chang
P. coriaceum Sam.	*P. plebeium* R. Br.
P. coriarium Grig.	*P. polycnemoides* Jaub. et Spach
P. criopolitanum Hance	*P. polystachyum* Wall. ex Meisn.
P. cyanandrum Diels	*P. popovii* Borod.
P. darrisii Lévl.	*P. posumbu* Buch.-Ham. ex D. Don
P. delicatulum Meisn.	*P. praetermissum* Hook. f.
P. dichotomum Blume	*P. pubescens* Blume
P. dissitiflorum Hemsl.	*P. pulchrum* Blume
P. divaricatum L.	*P. purpureonervosum* A. J. Li

Scientific Name	Scientific Name
P. ellipticum Willd. ex Spreng.	*P. rigidum* Skv.
P. emodi Meisn.	*P. runcinatum* Buch.-Ham. ex D. Don
P. fertile (Maxim.) A. J. Li	*P. sagittatum* L.[V]
P. filicaule Wall. ex Meisn.	*P. schischkinii* Ivan. ex Borod.
P. foliosum H. Lindb.	*P. senticosum* (Meisn.) Franch. et Sav.
P. forrestii Diels	*P. sibiricum* Laxm.
P. glabrum Willd.	*P. sinomontanum* Sam.
P. glaciale (Meisn.) Hook. f.	*P. songaricum* Schrenk
P. griffithii J. D. Hooker[II]	*P. sparsipilosum* A. J. Li
P. hastatosagittatum Mak.	*P. strigosum* R. Br.
P. honanense Kung	*P. strindbergii* Schust.
P. hookeri Meisn.	*P. subscaposum* Diels
P. huananense A. J. Li	*P. suffultoides* A. J. Li
P. humifusum Merk ex C. Koch	*P. suffultum* Maxim.
P. humile Meisn.	*P. taquetii* Lévl.
P. hydropiper L.	*P. thunbergii* Sieb. et Zucc.
P. intramongolicum A. J. Li	*P. Tibeticum* Hemsl.
P. japonicum Meisn.	*P. tinctorium* Ait.
P. jucundum Meisn.	*P. tortuosum* D. Don
P. kawagoeanum Makino[III]	*P. umbrosum* Sam.
P. lapathifolium L.	*P. vacciniifolium* Wall. ex Meisn.[VI]
P. lichiangense W. W. Smith	*P. viscoferum* Mak.
P. limicola Sam.	*P. viscosum* Buch.-Ham. ex D. Don
P. limosum Kom.	*P. viviparum* L.
P. longisetum De Br.	*P. wallichii* Meisn.
P. maackianum Regel	

[I] Recorded as *P. argyrocoleum* Steud. ex Kunze in *FRPS*
[II] Recorded as *P. calostachyum* Diels in *FRPS*
[III] Recorded as *P. tenellum* Blume in *FRPS*
[IV] Recorded as *P. nummularifolium* Meisn in *FRPS*
[V] Recorded as *P. sieboldii* Meisn. in *FRPS*
[VI] Recorded as *P. vaccinifolium* Wall. ex Meisn. in *FRPS*

Fungi

Phylum	Family	Species	H. R.	Ref.
Ascomycota	Erysiphaceae	*Erysiphe betae* (Vaňha) Weltzien	po	[26]I
			po	[24]I
		Sphaerotheca pannosa (Wallr.) Lév.	mo	[26]
	Sclerotiniaceae	*Sclerotinia sclerotiorum* (Lib.) de Bary	po	[26]
Basidiomycota	Atheliaceae	*Athelia rolfsii* (Curzi) C.C. Tu & Kimbr.	po	[26]II
	Melanopsichiaceae	*Melanopsichium nepalense* (Liro) Zundel	po	[26]III
			mo	[64]IV

Phylum	Family	Species	H. R.	Ref.
		Melanopsichium pennsylvanicum Hirschh.	po	[26]
			oo	[64]
	Microbotryaceae	*Liroa emodensis* (Berk.) Cif.	mo	[64]
			oo	[26]V
		Microbotryum reticulatum (Liro) R. Bauer & Oberw.	oo	[26]VI
			oo	[64]VII
		Sphacelotheca hydropiperis (Schumach.) de Bary	oo	[26]
			o	[64]
	Pucciniaceae	*Puccinia barclayi* S. Ahmad	mo	[229]
		Puccinia benokiyamensis Hirats. f.	oo	[26]
			oo	[229]
		Puccinia bistortae (F. Strauss) DC.	oo	[26]
			oo	[229]
		Puccinia calumnata Syd. & P. Syd.	oo	[26]
			mo	[229]
		Puccinia congesta Berk. & Broome	oo	[26]
			oo	[229]
		Puccinia fagopyricola Jørst.	po	[26]
		Puccinia hanyuenensis F.L. Tai	mo	[26]
			oo	[229]
		Puccinia iwateyamensis Hirats. f.	mo	[229]
		Puccinia kweichowana Cummins	mo	[26]
			oo	[229]
		Puccinia mammillata J. Schröt.	oo	[26]
			mo	[229]
		Puccinia nitidula Tranzschel	mo	[26]
			oo	[229]
		Puccinia omeiensis	mo	[26]
		Puccinia phragmitis (Schumach.) Körn.	po	10
		Puccinia polygoni-alpini Cruchet & Mayor	mo	[229]
		Puccinia polygoni-amphibii Pers.	o	[26]
			p	[229]

Phylum	Family	Species	H. R.	Ref.
		Puccinia polygonicola F.L. Tai	oo	[26]
			oo	[229]
		Puccinia polygoni-lapathifolii T. N. Liou & Y. C. Wang	mo	[229]
		Puccinia polygoni-sieboldii (Hirats. & S. Kaneko) B. Li	mo	[229]
		Puccinia polygoni-weyrichii Miyabe	oo	[26]
		Puccinia septentrionalis Juel	mo	[229]
		Puccinia taliensis F.L. Tai	oo	[26]
			oo	[229]
		Puccinia taylorii Balf.-Browne	oo	[229]
		Puccinia thibetana J.Y. Zhuang	mo	[229]
		Puccinia vivipari Jørst.	mo	[26]
			oo	[229]
		Puccinia wulingensis B. Li	mo	[229]
		Puccinia yunnanensis F.L. Tai	po	[26]
		Uromyces polygoni-avicularis (Pers.) P. Karst.	po	[26]
	Ustilaginaceae	*Ustilago anhweiana* Zundel	oo	[26]
		Ustilago anomala J. Kunze ex G. Winter	oo	[26]
		Ustilago bistortarum (DC.) Körn.	oo	[64]
		Ustilago bosniaca Beck	oo	[64]
		Ustilago cordae Liro	oo	[64]
			oo	[26]
		Ustilago dehiscens L. Ling	mo	[64]
		Ustilago filamenticola L. Ling	mo	[64]
			mo	[26]
		Ustilago koenigiae Rostr.	mo	[26]
			mo	[64]
		Ustilago longiseti Vánky & Oberw.	mo	[64]
		Ustilago ochrearum Berk.	oo	[26]
			oo	[64]
		Ustilago picacea Lagerh. & Liro	mo	[64]
		Ustilago piperi G.P. Clinton	mo	[64]
		Ustilago polygoni-alati Thirum. & Pavgi	mo	[64]
		Ustilago pustulata (DC.) G. Winter	mo	[64]

Phylum	Family	Species	H. R.	Ref.
		Ustilago sinkiangensis Y.C. Wang	oo	[26]
		Ustilago tuberculiformis Syd. & P. Syd.	mo	[64]
			oo	[26]
Oomycota	Albuginaceae	*Albugo polygoni* Z.D. Jiang & P.K. Chi	oo	[202]
	Peronosporaceae	*Peronospora sinensis* D.Z. Tang	po	[202]
	Pythiaceae	*Phytophthora polygoni* Sawada	oo	[26]
			oo	[202]
Anamorphic *Guignardia*		*Phyllosticta polygoni-bungeani* Miura	mo	[26]
		Phyllosticta polygonorum Sacc.	po	[26]
Anamorphic *Lewia*		*Alternaria alternata* (Fr.) Keissl.	po	[26]
Anamorphic *Mycosphaerella*		*Cercospora persicariae* W. Yamam.	oo	[26]
		Cercospora polygonaceae Ellis & Everh.	oo	[26]
		Cercospora polygonorum Cooke	oo	[26]
		Cladosporium effusum Berk. & M.A. Curtis	po	[210]
		Passalora polygoni Y. L. Guo	mo	[65]
		Pseudocercospora avicularis (G. Winter) A.Z.M. Khan & Shamsi	mo	[129]
		Pseudocercospora persicariae (W. Yamam.) Deighton	oo	[129]
		Pseudocercospora polygonicola (A.K. Kar & M. Mandal) Deighton	oo	[129]
		Pseudocercospora polygonorum (Cooke) Y.L. Guo & X.J. Liu	oo	[129]
		Septoria polygonicola (Lasch) Sacc.	oo	[26]
		Septoria polygonorum Desm.	oo	[26]
			po	[1]
Anamorphic Mycosphaerellaceae		*Ascochyta polygoni* Rabenh.	mo	[26]
Anamorphic Uredinales		*Aecidium polygoni-cuspidati* Dietel	oo	[26]

[I]Recorded as *Erysiphe polygoni* DC.
[II]Recorded as *Corticium centrifugum* (Lév.) Bres.
[III]Recorded as *Ustilago nepalensis* Lindr.
[IV]Recorded as *Ustilago nepalensis* Liro
[V]Recorded as *Ustilago emodensis* Berk.
[VI]Recorded as *Ustilago reticulata* Lindr.
[VII]Recorded as *Ustilago reticulata* (Zundel) Vánky & Oberwinkler

Arthropods

Order	Family	Species	H. R.	Ref.
Acariformes	Tetranychidae	*Tetranychus truncatus* Ehara	po	[167]
Coleoptera	Chrysomelidae	*Chaetocnema bella* (Baly)	oo	[165]
		Chaetocnema concinna (Marsham)	oo	[75]
			oo	[201]
		Entomoscelis orientalis Motschulsky	po	[201]
		Galeruca barovskyi Jacobson	oo	[201]
		Galerucella grisescens (Joannis)	po	[201]
			po	[75]
		Gallerucida bifasciata Motschulsky	po	[201]
		Gallerucida singularis (Harold)	oo	[201]
		Gastrophysa atrocyanea (Motschulsky)	po	[201]
		Gastrophysa polygoni (L.)	mo	[201]
		Geinella invenusta (Jacobson)	po	[201]
		Geinella splendida Chen, Jiang & Wang	po	[165]
			po	[201]
		Hespera auricuprea Chen & Wang	po	[165]
		Hespera brachyelytra Chen & Wang	po	[201]
			po	[165]
		Stenoluperus flavipes Chen	po	[165]
		Stenoluperus nipponensis (Laboissiere)	po	[178]
			po	[75]
			po	[165]
	Crioceridae	*Lema lacosa* Pic	po	[75]
			po	[164]
		Lema paagai Chûjô	po	[164]
		Lilioceris merdigera (L.)	po	[75]
			po	[164]
	Curculionidae	*Lagenolobus sieversi* Faust	oo	[211]
	Eumolpidae	*Basilepta pubiventer* T'an	oo	[165]
		Basilepta ruficolle (Jacoby)	po	[75]
			po	[164]
		Chlamisus mosaicus T'an	mo	[165]
		Cryptocephalus aberrans Jacoby	oo	[164]
		Nodina pilifrons Chen	oo	[165]
		Pachnephorus seriatus Lefèvre	po	[164]
		Smaragdina aurita hammarstraemi (Jacobson)	po	[164]
Hemiptera	Coreidae	*Cletus punctulatus*(Westwood)	po	[207]
		Mictis angusta Hsiao	po	[207]
	Lygaeidae	*NySius ericae* (Schilling)	po	[207]
	Pentatomidae	*Hoplistodera fergussoni* Distant	po	[208]
	Plataspidae	*Coptosoma parvipicta* Montandon	m	[208]

Order	Family	Species	H. R.	Ref.
Homoptera	Aphalaridae	*Aphalara fasciata* Kuwayama	po	[178]
			mo	[160]
		Aphalara polygonia Foerter	mo	[160]
	Aphididae	*Capitophorus javanicus* Hille Ris Lambers	p	[205]
		Margituberculatus longituberculatus Zhang	oo	[165]
	Coccidae	*Ceroplastes ceriferus* (Anderson)	po	[173]
		Ceroplastes floridensis Comstock	po	[173]
	Triozidae	*Eubactericera drepanoides* Li	mo	[160]
Hymenoptera	Tenthredinidae	*Tenthredo mesomelas* (L.)	po	[166]
Lepidoptera	Arctiidae	*Hyphantria cunea* (Drury)	po	[45]
		Lemyra phasma (Leech)	po	[45]
		Rhyparioides metelkana (Lederer)	po	[44]
			po	[45]
		Spilosoma lubricipedum (L.)	po	[45]
			po	[178]I
	Crambidae	*Chilo suppressalis* (Walker)	po	[169]
		Mecyna gilvata Fabricius	po	[169]
			po	[25]
		Nomophila noctuella Denis & Schiffermüller	po	[169]
	Geometridae	*Calothysanis comptaria* Walker	po	[78]
			mo	[189]
		Dysstroma citrata (L.)	po	[195]
		Lythria purpuraria (L.)	po	[195]
	Lycaenidae	*Heliophorus ila matsumurae* (Fruhstorfer)	po	[219]
	Lymantriidae	*Cifuna locuples* Walker	po	[166]
	Noctuidae	*Acronicta rumicis* (L.)	po	[75]
			po	[178]
			po	[25]
			po	[224]II
		Anaplectoides prasina (Denis & Schiffermüller)	po	[11]
			?	[181]
		Discestra trifolii (Hüfnagel)	po	[15]III
		Grammodes geometrica (Fabricius)	po	[224]IV
		Lacanobia w-latinum (Hüfnagel)	po	[25]V
		Polia thalathina (Rottemburg)	po	[15]
		Simyra nervosa (Denis & Schiffermüller)	?	[25]
		Trachea atriplicis (L.)	po	[224]
			?	[25]
		Xylena formosa (Butler)	p	[224]VI
	Nymphalidae	*Speyeria aglaja* (L.)	po	[219]

Order	Family	Species	H. R.	Ref.
Thysanoptera	Phlaeothripidae	*Haplothrips aculeatus* (Fabricius)	po	[66]
		Haplothrips chinensis Priesner	po	[66]
	Thripidae	*Scolothrips takahashii* Priesner	po	[66]
		Thrips hawaiiensis (Morgan)	po	[66]

[I]Recorded as *Spilosoma pura* Leech
[II]Recorded as *Acronycta rumicis* (L.)
[III]Recorded as *Scotogramma trifolii* (Rottemberg)
[IV]Recorded as *Chalciope geometrica* (Fabricius)
[V]Recorded as *Polia w-latinum* Hufnagel
[VI]Recorded as *Xylina formosa* (Butler)

Populus alba
White poplar

Introduction
The genus *Populus* contains approximately 100 species throughout Eurasia and North America. Known for its rapid growth and tolerance for harsh environmental conditions, the genus *Populus* commonly occurs between 30-72° N, at elevations below 3000 m. In China, approximately 71 species including hybrids and cultivated varieties have been reported[46, 171].

Taxonomy
Order Salicales
Family Salicaceae
Genus *Populus* L.
Species *Populus alba* L.

Description
Populus alba is a broad-crowned deciduous tree that can reach 15-30 m in height.The bark is white to grayish white, smooth, becoming coarse in the lower bark. Young shoots are initially white tomentose, coppice shoots are grayish green to russet, and densely tomentose. The shiny, brown buds are ovate, 4-5 mm, acuminate apically, white tomentose and glabrescent. The leaves, measuring 4-8 cm in length and 2-5 cm in width are ovoid-rounded or elliptically ovate with an irregular dentate margin. The petiole is slightly flattened, tomentose, and equal in length to the leaf. The flowers are dioecious, appearing from April to May. Male catkins 3-6 cm long and female catkins are about 5-10 cm in length. The irregularly toothed bract is membranous, broadly elliptic, and has a length of about 3 mm. Stamens are 8-10 with violet anthers. The fruits are narrowly conical capsules, measuring 5 mm long, two-valved and glabrous, appearing in May[46, 171].

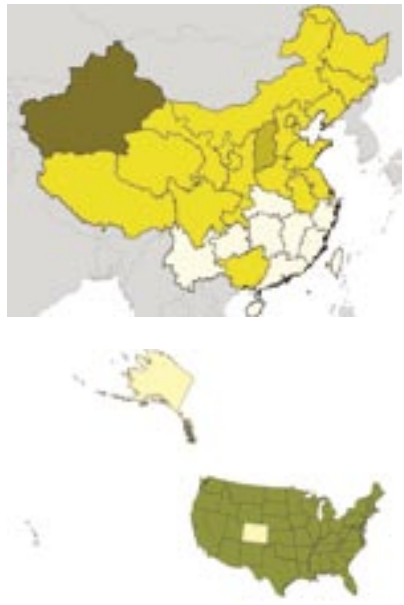
Habitat
P. alba occurs in areas with a continental climate. Although it tolerantes poor soil, wind and cold, *P. alba* also grows well in humid areas with fertile, sandy soil. *P. alba* is intolerant of hot, wet conditions where it is more susceptible to insect and disease attack [171].

Distribution
Populus alba is native to the Irtysh River area of northern Xinjiang province, occurring on the islands and along the river valley, and the Zinjinshan Mountain area of western Shanxi province[22, 43, 171]. *P. alba* is cultivated in the provinces of Anhui, Gansu, Guangxi, Hebei, Heilongjiang, Henan, Jiangsu, Liaoning, Ningxia, Shaanxi, and Tibet[34, 35, 62, 88, 171, 221].

Economic Importance
The wood of *P. alba* is straight-grained, fine textured, and light weight, making it useful material for construction, furniture and paper. The ground leaves are used to remedy bed bug infestations. Because of its attractive growth form, *P. alba* is often used in landscaping. In the desert plain area of northwestern China, *P. alba* is cultivated for use as windbreaks[171].

Related Species
Two varieties of *P. alba* are reported in China. *P. alba* var. *pyramidalis* Bunge has a pyramidal crown, in contrast to the rounded crown of other varieties, *P. alba* var. *bachofenii* (Wierzbicki ex Rochel) Wesmael, differs from *P. alba* in its bark color and leaf shape. The bark of *P. alba* var. *bachofenii* is gray or bluish gray and the leaves of the short branchlets are abaxially subglabrous[46, 171].

Natural Enemies of *Populus*
Sixty nine fungi and 419 arthropods have been recorded for the plants of the genus *Populus*.



Species of *Populus* in China[46, 171]

Scientific Name	Scientific Name
P. × *beijingensis* W. Y. Hsu[I]	*P. minhoensis* S. F. Yang & H. F. Wu*
P. × *berolinensis* Dipp.	*P. nakaii* Skv.
P. × *canadensis* Moench	*P. nigra* L.
P. ×*gansuensis* C. Wang & H. L. Yang[†]	*P. ningshanica* C. Wang et Tung
P. ×*hopeiensis* Hu & Chow in Hu[‡]	*P. pamirica* Kom.
P. × *jrtyschensis* Ch. Y. Yang	*P. pilosa* Rehd.
P. × *pseudo-tomentosa* C. Wang et Tung	*P. pruinosa* Schrenk
P. × *xiaohei* T. S. Hwang et Liang	*P. pruinosa* Schrenk*
P. × *xiaozhuanica* W. Y. Hsu et Liang	*P. przewalskii* Maxim.
P. adenopoda Maxim.	*P. pseudoglauca* C. Wang et P. Y. Fu
P. afghanica (Ait. et Hemsl.) Schneid.	*P. pseudomaximowiczii* C. Wang et Tung
P. alachanica Kom.	*P. pseudo-simonii* Kitag.
***P. alba* L.**	*P. purdomii* Rehd
P. amurensis Kom.	*P. qamdoensis* C. Wang et Tung
P. candicans Ait.	*P. qiongdaoensis* T. Hong & P. Luo*
P. canescens (Ait.) Smith.	*P. rotundifolia* Griff.
P. cathayana Rehd	*P. schneideri* (Rehder) N. Chao*
P. charbinensis C. Wang et Skv.	*P. shanxiensis* C. Wang et Tung
P. ciliata Wall.	*P. simonii* Carr.
P. davidiana Dode	*P. suaveolens* Fisch.
P. euphratica Oliv.	*P. szechuanica* Schneid.
P. girinensis Skv.	*P. talassica* Kom.
P. glauca Haines	*P. tomentosa* Carr.
P. haoana Cheng et C. Wang	*P. tremula* L.
P. hsinganica C. Wang et Skv.	*P. trinervis* C. Wang et Tung
P. iliensis Drob.	*P. ussuriensis* Kom.
P. intramongolica T. Y. Sun & E. W. Ma*	*P. violascens* Dode
P. kangdingensis C. Wang et Tung	*P. wenxianica* Z. C. Feng & J. L. Guo ex G. Zhu*
P. keerqinensis T. Y. Sun	*P. wilsonii* Schneid.
P. koreana Rehd.	*P. wuana* C. Wang et Tung
P. lancifolia N. Chao*	*P. wulianensis* S. B. Liang & X. W. Li*
P. lasiocarpa Oliv.	*P. xiangchengensis* C. Wang & S. L. Tung
P. laurifolia Ledeb.	*P. yatungensis* (C. Wang et P. Y. Fu) C. Wang et Tung
P. mainlingensis C. Wang et Tung	*P. yuana* C. Wang et Tung
P. manshurica Nakai	*P. yunnanensis* Dode
P. maximowiczii Henry	

[I]Result of hybridization
*Not listed in the *FRPS*
[†]Recorded as *P. gansuensis* C. Wang et H. L. Yang in *FRPS*
[‡]Recorded as *P. hopeiensis* Hu et Chow in *FRPS*

Fungi

Phylum	Family	Species	H. R.	Ref
Ascomycota	Botryosphaeriaceae	*Macrophoma tumefaciens* Shear	oo	***[26]***
	Capnodiaceae	*Capnodium salicinum* Mont.	po	[26]
	Dermateaceae	*Drepanopeziza populorum* (Desm.) Höhn.	oo	***[26]I***
		Gloeosporium populi-albae Desm.	m	[26]
	Diatrypaceae	*Cryptosphaeria ligniota* (Fr.) Auersw.	oo	[26]II
	Erysiphaceae	*Phyllactinia guttata* (Wallr.) Lév.	p	***[26]III***
		Phyllactinia populi (Jacz.) Y.N. Yu	o	[24]
		Pleochaeta populicola X.L. Zhang	mo	[24]
		Uncinula adunca var. *adunca* (Wallr.) Lév.	po	[24]IV
			po	[26]V
		Uncinula adunca var. *mandshurica* (Miura) R.Y. Zheng & G.Q. Chen	po	[24]
		Uncinula fragilis R.Y. Zheng & G.Q. Chen	mo	[24]
		Uncinula longispora var. *longispora*	po	[24]
		Uncinula longispora var. *minor* R.Y. Zheng & G.Q. Chen	mo	[24]
		Uncinula mandshurica Miura	oo	[26]
		Uncinula pseudocedrelae R.Y. Zheng & G.Q. Chen	mo	[24]
		Uncinula salicis (DC.) Wint. forma *populorum* Rabenh.	mo	[26]
	Mycosphaerellaceae	*Mycosphaerella mandshurica* Miura	mo	[26]
		Mycosphaerella populi (Auersw.) J. Schröt.	oo	[26]VI
	Phyllachoraceae	*Plectosphaera populina* (Maubl.) Arx & E. Müll.	oo	[26]VII
		Lambertella fructicola Dumont	oo	[230]
	Taphrinaceae	*Taphrina populina* Fr.	oo	[26]
	Valsaceae	*Chondroplea populea* (Sacc. & Briard) Kleb.	mo	[26]VIII
		Valsa ambiens (Pers.) Fr.	oo	[26]IX
		Valsa sordida Nitschke	oo	[26]X
			po	[26]
	Venturiaceae	*Napicladium asteroma* Allesch.	mo	[26]
		Venturia tremulae Aderh.	oo	[26]
Basidiomycota	Ganodermataceae	*Ganoderma applanatum* (Pers.) Pat.	po	[26]
	Hericiaceae	*Hericium coralloides* (Scop.) Pers.	oo	[26]
		Inonotus rheades (Pers.) Bondartsev & Singer	po	[26]
	Hymenochaetaceae	*Inonotus radiatus* (Sowerby) P. Karst.	po	[26]
		Phellinus igniarius (L.) Quél.	po	[26]
		Phellinus setulosus (Lloyd) Imazeki	po	[26]
		Phellinus yucatanensis (Murrill) Imazeki	oo	[26]
		Xanthochrous hispidus (Bull.) Pat.	po	[26]
	Melampsoraceae	*Melampsora laricis-populina* Kleb.	po	[26]
		Melampsora magnusiana G. Wagner	po	[26]
		Melampsora populnea (Pers.) P. Karst.	o	[26]XI
		Melampsora populnea f.sp. *laricis* Boerema & Verh.	oo	[26]XII
		Melampsora pruinosae Tranzschel	oo	[26]

Phylum	Family	Species	H. R.	Ref
	Platygloeaceae	*Helicobasidium brebissonii* (Desm.) Donk	p	[26]
	Pleurotaceae	*Pleurotus calyptratus* (Lindblad) Sacc.	oo	[26]
		Pleurotus ostreatus (Jacq.) Quél.	po	[26]
	Polyporaceae	*Coriolus unicolor* (Bull.) Pat.	po	[26]
		Daedaleopsis confragosa (Bolton) J. Schröt.	po	[26]
		Favolus squamosus (Huds.) Ames	po	[26]
		Fomes fomentarius (L.) J.J. Kickx	p	[26]
		Trametes hirsuta (Wulfen) Pilát	po	[26]XIII
		Trametes suaveolens (L.) Fr.	po	[26]
	Strophariaceae	*Pholiota adiposa* (Fr.) Quél.	po	[26]
		Pholiota populnea (Pers.) Kuyper & Tjall.-Beuk.	oo	[26]XIV
	Tricholomataceae	*Tectella calyptrata* (Lindbl.) Sing.	mo	[26]
Anamorphic *Acantharia*		*Fusicladium tremulae* Fr.	mo	[26]
Anamorphic Ascomycetes		*Myxosporium rimosum* Fautrey	mo	[26]
		Rhabdospora longispora Ferraris	oo	[26]
Anamorphic *Diplocarpon*		*Marssonina larici* Hart.	oo	[26]
		Marssonina populicola Miura	oo	[26]
Anamorphic *Gibberella*		*Fusarium ciliatum* Sacc.	po	[26]
		Fusarium sarcochroum (Desm.) Sacc.	mo	[26]
Anamorphic *Guignardia*		*Phyllosticta populea* Sacc.	oo	[26]
		Phyllosticta populina Sacc.	mo	[26]
Anamorphic *Leptosphaeria*		*Coniothyrium olivaceum* Bonord.	oo	[26]
		Coniothyrium populicola Miura	oo	[26]
Anamorphic *Lewia*		*Alternaria dauci* f. sp. *solani*	po	[26]
Anamorphic *Mycosphaerella*		*Pseudocercospora salicina* (Ellis & Everh.) Deighton	po	[129]
		Septoria populicola Peck	oo	[26]
Anamorphic Mycosphaerellaceae		*Ascochyta populi* Delacr.	mo	[26]
Anamorphic *Pseudovalsa*		*Coryneum populinum* Bres.	oo	[26]
Anamorphic Uredinales		*Uredo tholopsora* Cummins	oo	[26]
Anamorphic *Venturia*		*Pollaccia radiosa* (Lib.) E. Bald. & Cif.	oo	[26]XV

[I]Recorded as *Marssonina populi* (Lib.) Magn.
[II]Recorded as *Cryptosphaeria populina* (Pers) Wint
[III]Recorded as *Phyllactinia corylea* (Pers.) Karst.
[IV]Recorded as *Uncinula adunca* (Wallr.)
[V]Recorded as *Uncinula salicis* (DC.) Wint.
[VI]Recorded as *Septoria populi* Desm
[VII]Recorded as *Physalospora populina* Maubl.
[VIII]Recorded as *Dothichiza populea* Sacc. et Br
[IX]Recorded as *Valsa populina* Fuckel.
[X]Recorded as *Cytospora chrysosperma* (Pers.) Fr.
[XI]Recorded as *Melampsora rostrupii* Wagn.
[XII]Recorded as *Melampsora laricis* Hart.

[XIII]Recorded as *Coriolus hirsutus* (Wulf ex Fr.) Quél
[XIV]Recorded as *Pholiota destruens* (Brond.) Gill.
[XV]Recorded as *Fusicladium radiosum* (Lib.) Lind

Arthropods

Order	Family	Species	H. R.	Ref.
Acariformes	Eriophyidae	*Tetraspinus populi* Kuang & Hong	mo	[94]
			oo	[90]
	Tetranychidae	*Eotetranychus geniculatus* Ehara	po	[167]
		Eotetranychus populi (Koch)	p	[167]
		Tetranychus urticae (Koch)	po	[94]
		Tetranychus viennensis Zacher	po	[94]
Coleoptera	Attelabidae	*Apoderus jekeli* Roelofs	po	[94]
		Byctiscus congener Jekel	po	[94]
	Buprestidae	*Melanophila decastigma* Fabricius	mo	[94]
	Cerambycidae	*Acalolepta degener* (Bates)	p	[94]
		Acanthoderes clavipes (Schrank)	po	[86]
		Agapanthia daurica Ganglbauer	po	[150]
		Anoplodera rubra dichroa (Blanchard)	po	[94]
		Anoplophora chinensis (Förster)	po	[94]
			p	[13]
			p	[75]
		Anoplophora glabripennis (Motschulsky)	po	[94]
		Anoplophora nobilis Ganglbauer	po	[86]
		Aphrodisium provosti (Fairmaire)	po	[94]
		Apriona germari (Hope)	po	[94]
		Aromia bungii Faldermann	po	[94]
			p	[178]
		Aromia moschata (L.)	p	[75]
		Aromia moschata orientalis Plavils	p	[13]
		Asias halodendri (Pallas)	po	[178]
		Bacchisa atriarsis (Pic)	po	[94]
		Bandar pascoei (Lansberge)	po	[94]
		Batocera horsfieldi (Hope)	po	[94]
			p	[178]
		Chelidonium provosti (Fairmaire)	p	[150]
		Chelidonium purpureipes Gressitt	po	[94]
		Chlorophorus diadema Motschulsky	po	[94]
		Chlorophorus macaumensis (Chevrolat)	po	[94]
		Chlorophorus sexmaculatus (Motschulsky)	po	[94]
			p	[75]
		Coscinesthes porosa Bates	p	[165]
			p	[75]

Order	Family	Species	H. R.	Ref.
		Dorysthenes hydropicus Pascoe	po	[94]
		Dorysthenes paradoxus (Faldermann)	po	[94]
		Eutetrapha sedecimpunctata (Motschulsky)	po	[94]
		Lamiomimus gottschei Kolbe	po	[94]
		Leptura thoracica Creutzer	p	[13]
			p	[178]
			p	[75]
		Megopis sinica White	p	[13]
			po	[94]
		Mesosa longipennis Bates	p	[13]
		Neocerambyx mandarinus Gressitt	p	[150]
			po	[94]
		Olenecamptus octopustulatus Motschulsky	po	[94]
		Psacothea hilaris (Pascoe)	p	[178]
		Pseudaeolesthes chrysothrix (Bates)	po	[94]
		Rhopaloscelis unifasciatus Blessig	p	[86]
		Saperda carcharias (L.)	po	[150]
		Saperda perforata (Pallas)	m	[86]
		Saperda populnea (L.)	po	[94]
			po	[150]
		Toxotus meridianus (L.)	p	[86]
		Trichoferus campestris (Faldermann)	po	[94]
		Trichoferus campestris Faldermann	p	[150]
		Trirachys orientalis Hope	po	[94]
		Xylotrechus magnicollis (Fairmaire)	po	[94]
	Cetoniidae	*Moseriana rugulosa* Ma	p	[143]
		Oxycetonia jucunda (Faldermann)	po	[94]
		Protaetia famelica Janson	p	[165]I
	Chrysomelidae	*Agelastica alni orientalis Baly*	p	[201]
		Agrosteomela chinensis (Weise)	mo	[94]
		Altica viridicyanea (Baly)	po	[94]
		Arthrotus nigrofasciatus (Jacoby)	po	[94]
		Chrysomela lapponica L.	po	[94]
		Chrysomela populi L.	po	[94]II
			p	[201]
			m	[165]
			p	[75]
		Chrysomela salicivorax (Fairmaire)	po	[94]III
		Chrysomela tremulae Fabricius	o	[165]
			p	[75]
			p	[201]
		Chrysomela vigintipunctata (Scopoli)	po	[94]IV
		Crepidodera pluta (Latreille)	p	[201]
			po	[94]

Order	Family	Species	H. R.	Ref.
		Fleutiauxia armata (Baly)	p	[201]
		Galeruca spectabilis (Faldermann)	po	[94]
		Galerucida gloriosa Baly	po	[94]
		Lochmaeata capreae (L.)	p	[201]
		Melasoma vigintipunctata Scopoli	po	[94]V
		Monolepta hieroglyphica (Motschulsky)	po	[94]
		Monolepta pallidula (Baly)	po	[201]
		Monolepta yoasanica Chen	po	[94]
		Phratora aenea Wang	m	[165]
		Phratora costipennis Chen	mo	[201]
		Phratora laticollis (Suffrian)	o	[201]
			oo	[165]
		Phratora moha Daccordi	m	[165]
		Phratora multipunctata (Jacoby)	po	[94]
		Phratora phaedonoides occidentalis Chen	p	[201]
			o	[165]
		Phratora vitellinae (L.)	po	[201]
		Plagiodera versicolora (Laicharting)	po	[94]
	Crioceridae	*Pedrillia annulata* Baly	po	[164]
	Curculionidae	*Chlorophanus auripes* Faust	mo	[94]
		Chlorophanus lineolus Motschulsky	mo	[211]
			po	[94]
		Chlorophanus sibiricus Gyllenhal	po	[94]
		Ectatorrhinus adamsi Pascoe	po	[94]
		Lepyrus japonicus Roelofs	po	[94]
			p	[75]
		Lixus amurensis Faust	mo	[94]
		Phyllobius virideaeris Laicharting	p	[211]
		Piazomias validus Motschulsky	p	[6, 211]
		Sympiezomias velatus (Chevrolat)	po	[94]
		Tanymecus urbanus Gyllenhal	p	[6, 211]
	Elateridae	*Agriotes fuscicollis* Miwa	po	[94]
		Pleonomus canaliculatus (Faldermann)	po	[94]
	Eumolpidae	*Abiromorphus anceyi* Pic	po	[94]
			p	[164]
		Basilepta davidi (Lefèvre)	po	[164]
		Clytra laeviuscula Ratzeburg	po	[94]
		Clytra quadripunctata (L.)	p	[164]
		Cryptocephalus koltzei Weise	mo	[94]
		Labidostomis bipunctata (Mannerheim)	po	[164]
			po	[94]
		Labidostomis chinensis (Lefèvre)	po	[164]
		Parascela cribrata (Schaufuss)	po	[164]
			po	[94]

Order	Family	Species	H. R.	Ref.
		Parnops glasunowi Jacobson	p	[164]
			po	[94]
		Smaragdina aurita hammarstraemi (Jacobson)	p	[164]
		Trichochrysea japana (Motschulsky)	po	[94]
	Hispidae	*Basiprionota bisignata* (Boheman)	p	[165]
			po	[94]
			p	[178]
			p	[75]
		Laccoptera quadrimaculata (Thunberg)	po	[94]
	Lucanidae	*Lucanus fortunei* Saunders	p	[178]
	Megalopodidae	*Zeugophora ancora* Reitter	oo	[164]
		Zeugophora scutellaris Suffrian	po	[164]
	Melolonthidae	*Apogonia chinensis* Moser	po	[94]
		Heptophylla picea Motschulsky	po	[94]
		Holotrichia convexopyga Moser	po	[94]
		Holotrichia diomphalia Bates	po	[94]
		Holotrichia lata Brenske	po	[94]
		Holotrichia oblita Feldermann	po	[94]
		Holotrichia parallela Motschulsky	po	[94]
		Holotrichia serobiculata Brenske	mo	[94]
		Holotrichia titanis Reitter	po	[94]
		Holotrichia trichophora (Fairmaire)	po	[94]
		Maladera castanea (Arrow)	po	[94]
		Maladera orientalis Motschulsky	po	[94]
		Maladera ovatula (Fairmaire)	po	[94]
		Polyphylla laticollis Lewis	po	[94]
	Rutelidae	*Adoretus sinicus* Burmeister	po	[94]
		Adoretus tenuimaculatus Waterhouse	po	[94]
		Anomala corpulenta Motschulsky	po	[94]
		Anomala rufocuprea Motschulsky	po	[94]
		Popillia atrocoerulea Bates	po	[94]
		Popillia pustulata Fairmaire	po	[94]
		Popillia quadriguttata (Fabricius)	po	[94]
		Proagopertha lucidula Faldermann	po	[94]
	Scolytidae	*Ambrosiodmus rubricollis* (Eichhoff)	p	[75]
			po	[197]
		Scolytoplatypus raja Blandford	p	[75]
		Trypophloeus alni Lindemann	oo	[165]
		Xyleborus adumbratus Blandford	po	[197]
		Xyleborus emarginatus Eichhoff	po	[197]
			po	[94]
		Xyleborus fornicatus Eichhoff	po	[197]
		Xyleborus interjectus Blandford	po	[197]
		Xyleborus lewisi Blandford	po	[197]

Order	Family	Species	H. R.	Ref.
		Xyleborus saxeseni Ratzeburg	po	[197]
			p	[165]
		Xyleborus semiopacus Eichhoff	po	[197]
Hemiptera	Miridae	*Adelphocoris lineolatus* (Goeze)	p	[207]
			po	[94]
	Pentatomidae Tingidae	*Erthesina fullo* (Thunberg)	p	[207]
			po	[94]
		Graphosoma rubrolineata (Westwood)	po	[94]
		Lelia decempunctata Motschulsky	p	[207]
			po	[94]
		Palomena amplifioata Distant	p	[207]
		Pentatoma japonica (Distant)	po	[94]
		Pentatoma metallifera (Motschulsky)	p	[208]
		Pentatoma rufipes (L.)	p	[207]
			po	[94]
		Rhaphigaster nebulosa Poda	p	[207]
		Hegesidemus habrus Drake	po	[94]
		Monostira unicostata (Mulsant & Rey)	p	[207]
		Physatocheila costata (Fabricius)	po	[208]
		Stephanitis sp.	po	[94]
Homoptera	Aphididae	*Pterocomma anyangense* Zhang	mo	[205]
		Pterocomma bailangense Zhang	mo	[205]
		Pterocomma neimongolense Zhang	oo	[205]VI
		Pterocomma sanpunum Zhang	mo	[205]
		Pterocomma sinipopulifoliae Zhang	oo	[205]
	Aphrophoridae	*Aphrophora intermedia* Uhler	po	[94]
	Cercopidae	*Eoscarta assimilis* (Uhler)	p	[178]
	Chaitophoridae	*Chaitophorus populeti* (Panzer)	p	[165]
		Chaitophorus populialbae (Boyer de Fonscolombe)	o	[205]
		Chaitophorus populihabitans Zhang	mo	[165]
		Chaitophorus populiyunnanensis Zhang	mo	[165]
		Chaitophorus saliniger Shinji	po	[94]
		Chaitophorus Tibetensis Zhang	oo	[205]
	Cicadellidae	*Bothrogonia sinica* Yang & Li	po	[94]
		Empoasca biguttula (Ishida)	po	[94]
		Empoasca flavescens (Fabricius)	po	[94]
		Empoasca limbifera Matsumura	mo	[94]
		Idiocerus urakawensis Matsumura	p	[57]
		Tettigoniella viridis (L.)	po	[94]
			p	[57]
	Cicadidae	*Cryptotympana atrata* (Fabricius)	p	[178]
			po	[94]
		Cryptotympana mandarina Distant	po	[94]
			p	[75]

Order	Family	Species	H. R.	Ref.
		Cryptotympana pustulata (Fabricius)	p	[75]
		Meimuna opalifera (Walker)	p	[178]
		Platypleura kaempferi (Fabricius)	po	[94]
		Suisha coreana (Matsumura)	p	[75]
	Coccidae	*Ceroplastes japonicus* Green	po	[165]
			po	[94]
			p	[75]
		Eulecanium douglasi (Sŭlc)	p	[173]
		Eulecanium rugulosum (Arch.)	p	[173]
		Parthenolecanium corni (Bouché)	p	[75]
		Parthenolecanium persicae (Fabricius)	po	[94]
	Diaspididae	*Dynaspidiotus britannicus* (Newstead)	po	[165]
		Lepidosaphes tubulorum Ferris	p	[165]
			po	[94]
		Lepidosaphes ulmi (L.)	po	[94]
		Pseudaulacaspis pentagona (Targioni-Tozzetti)	po	[94]
		Quadraspidiotus perniciosus (Comstock)	po	[94]
			p	[75]
		Quadraspidiotus slavonicus (Green)	po	[94]
	Fulgoridae	*Lycorma delicatula* (White)	p	[165]
			po	[94]
	Hormaphididae	*Doraphis populi* (Maskell)	po	[165]
	Lachnidae	*Longistigma Tibetensis* Zhang	p	[165]
	Membracidae	*Gargara genistae* (Fabricius)	po	[94]
	Pemphigidae	*Epipemphigus sanpupopuli* (Zhang & Zhong)	mo	[205]
		Kaburagia ensigallis (Tsai & Tang)	mo	[94]
		Kaburagia ovogallis (Tsai & Tang)	mo	[94]
		Pemphigus yangcola Zhang	o	[165]
		Pemphigus borealis Tullgren	oo	[205]
		Pemphigus chomoensis Zhang	mo	[205]
		Pemphigus circellatus Zhang & Zhong	mo	[165]
		Pemphigus immunis Buckton	oo	[205]
		Pemphigus mankamensis Zhang	m	[165]
		Pemphigus matsumurai Monzen	mo	[205]
			oo	[165]
		Pemphigus protospirae Lichtenstein	po	[205]
		Pemphigus sinobursarius Zhang	mo	[205]
		Pemphigus Tibetensis Zhang	mo	[205]
			oo	[165]
		Pemphigus yangcola Zhang	mo	[205]
		Pemphigus yunnanensis Zhang	mo	[205]
			o	[165]
		Thecabius populi (Tao)	m	[75]
	Phloeomyzidae	*Phloeomyzus passerinii zhangwuensis* Zhang	oo	[205]
	Ricaniidae	*Ricania speculum* (Walker)	po	[94]

Order	Family	Species	H. R.	Ref.
Hymenoptera	Siricidae	*Tremex apicalis* Matsumura	po	[94]
	Tenthredinidae	*Rhogogaster viridis* (L.)	po	[166]
Isoptera	Rhinotermitidae	*Reticulitermes chinensis* Snyder	po	[94]
	Termitidae	*Macrotermes barneyi* Light	po	[94]
Lepidoptera	Aegeriidae	*Paranthrene tabaniformis* Rottenburg	po	[94]
	Arctiidae	*Aloa lactinea* (Cramer)	po	[94]
		Hyphantria cunea (Drury)	p	[44]
				[45]
		Lemyra melli (Daniel)	p	[166]
		Spilarctia subcarnea (Walker)	po	[94]
	Callidulidae	*Cleis fasciata* Butler	mo	[178]
			mo	[75]
	Cossidae	*Azygophleps albofasciata* Moore	po	[94]
		Cossus cossus L.	po	[94]
			p	[166]
		Holcocerus vicarius Walker	p	[178]
			po	[94]
		Xyleutes leuconotus (Walker)	po	[94]
		Zeuzera pyrina L.	po	[94]
			p	[178]
	Crambidae	*Botyodes asialis* Guenée	m	[169]
			m	[166]
		Botyodes diniasalis Walker	m	[169]
			po	[94]
			m	[75]
		Botyodes principalis Guenée	po	[94]
			po	[169]
			p	[178]
		Diaphania perspectalis (Walker)	mo	[75]
	Drepanidae	*Cyclidia substigmaria* (Hübner)	po	[94]
		Drepana curvatula (Borkhausen)	po	[75]
	Gelechiidae	*Anacampsis populella* Clerck	po	[78]
	Geometridae	*Abraxas suspecta* Warren	p	[94]
			p	[178]
		Alcis repandata L.	po	[94]
			p	[78]
		Apocheima cinerarius Erschoff	p	[78]
		Archiearis notha Hübner	p	[78]
		Archiearis notha suifunensis Kardakoff	po	[161]VII
		Arichanna melanaria (L.)	po	[161]
		Biston betularia (L.)	po	[94]
			p	[78]

Order	Family	Species	H. R.	Ref.
		Biston comitata Warren	po	[161]
			p	[75]VIII
			po	[94]VIII
		Calospilos suspecta Warren	po	[161]
		Culcula panterinaria (Bremer & Grey)	p	[75]
			p	[178]
			po	[94]
			p	[78]
		Cystidia stratonice (Stoll)	po	[94]
			p	[78]
		Epione vespertaria Fabricius	p	[78]
		Erebomorpha consors Butler	po	[161]
		Gelasma illiturata(Walker)	po	[161]
		Hipparchus papilionaria L.	p	[78]
		Hypomecis punctinalis conferenda (Butler)	p	[178]
		Lomaspilis marginata amurensis (Heydemann)	po	[161]
		Lygris testata achatinellaria Oberthür	po	[161]
		Naxa seriaria Motschulsky	po	[94]
		Ochrognesia difficta (Walker)	po	[161]
			p	[166]
			p	[178]
			p	[75]
			po	[94]
			p	[78]
		Odontopera aurata (Prout)	p	[178]
		Ophthalmitis albosignaria (Bremer & Grey)	p	[75]
			p	[166]
			p	[178]
		Ophthalmodes sinensium Oberthür	p	[178]
		Ourapteryx persica Ménétriès	po	[161]
		Percnia giraffata (Guenée)	p	[178]
		Serraca punctinalis conferenda Butler	po	[94]
		Yala pyricola Chu	p	[78]
		Zamacra excavata Dyar	po	[94]
	Gracillariidae	*Lithocolletis ringoniella* Matsumura	po	[94]
	Lasiocampidae	*Cyclophragma yamadai* (Nagano)	po	[94]
		Gastropacha populifolia Esper	po	[94]
		Gastropacha quercifolia (L.)	po	[94]
		Malacosoma dentata Mell	po	[94]
		Malacosoma neustria testacea Motschulsky	po	[94]
			p	[166]
		Odonestis pruni L.	po	[94]
	Limacodidae	*Cnidocampa flavescens* (Walker)	po	[94]
			p	[78]

Order	Family	Species	H. R.	Ref.
		Latoia consocia Walker	p	[78]IX
			po	[94]IX
		Latoia hilarata (Staudinger)	po	[94]X
		Latoia lepida (Cramer)	po	[94]XI
		Latoia pseudorepanda (Hering)	po	[94]XII
		Latoia repunda (Walker)	po	[94]XIII
		Monema flavescens Walker	p	[178]
			p	[75]
		Narosoideus vulpinus (Wileman)	po	[94]
		Parasa sinica Moore	po	[94]
			p	[78]
		Setora postornata (Hampson)	po	[94]
		Thosea sinensis (Walker)	po	[94]
			p	[75]
			p	[78]
	Lymantriidae	*Arctornis alba* (Bremer)	po	[94]
		Arctornis l-nigrum (Müller)	po	[94]
			p	[212]
			p	[75]
		Cifuna locuples Walker	p	[166]
			po	[94]
		Dasychira chekiangensis Collenette	po	[94]
		Dasychira chinensis Swinhoe	p	[75]
		Dasychira conjuncta Wileman	po	[94]
			p	[75]
		Dasychira fascelina (L.)	po	[212]
		Dasychira olga (Oberthür)	p	[212]
		Dasychira pudibunda (L.)	p	[212]
		Euproctis bipunctapex (Hampson)	p	[212]
			p	[166]
			po	[94]
			p	[178]
			p	[75]
		Euproctis chrysorrhoea (L.)	p	[212]
		Euproctis karghalica Moore	p	[212]
			p	[213]
		Laelia coenosa (Hübner)	p	[75]
			p	[212]
			po	[94]
			p	[178]
		Laelia monoscola Collenette	po	[94]
		Lymantria dispar (L.)	po	[212]
			mo	[166]
			po	[94]

Order	Family	Species	H. R.	Ref.
		Lymantria mathura Moore	p	[166]
		Lymantria monacha (L.)	po	[212]
			po	[94]
		Orgyia antiqua (L.)	p	[212]
		Orgyia dubia (Tauscher)	p	[212]
		Orgyia gonostigma (L.)	p	[212]
			po	[94]
			p	[75]
		Porthesia similis (Fueszly)	p	[178]
			po	[94]
			p	[212]
			p	[75]
		Stilpnotia candida Staudinger	p	[212]
			p	[166]
			po	[94]
			p	[75]
		Stilpnotia melanoscela Collenette	po	[94]
			p	[75]
		Stilpnotia salicis (L.)	p	[212]
			po	[94]
		Stilpnotia sartus (Erschoff)	po	[213]
		Teia ericae Germar	p	[212]
			po	[94]
			p	[213]
		Teia gonostigma (L.)	p	[213]
	Noctuidae	*Acronicta intermedia* Warren	po	[94]
		Acronicta megacephala (Denis & Schiffermüller)	p	[15]
			p	[166]
		Acronicta rumicis (L.)	po	[94]
		Agrotis exclamationis (L.)	po	[94]XIV
		Agrotis ipsilon (Hufnagel)	po	[94]
		Agrotis segetum (Denis & Schiffermüller)	po	[94]
			po	[166]
		Agrotis tokionis Butler	po	[94]
		Amathes triangulum Hufnagel	po	[94]
		Amphipyra perflua (Fabricius)	po	[94]
			p	[75]
			p	[166]
		Amphipyra pyramidea (L.)	po	[94]
		Catocala electa (Vieweg)	po	[224]
			po	[94]
		Catocala elocata (Esper)	p	[15]
		Colobochyla salicalis (Denis & Schiffermüller)	po	[94]
			p	[228]

Order	Family	Species	H. R.	Ref.
		Cymatophoropsis trimaculata (Bremer)	po	[94]
		Earias pudicana Staudinger	p	[178]XV
			po	[224]XV
			po	[94]XV
		Euxoa oberthuri Leech	po	[94]
			po	[94]
		Ipimorpha retusa (L.)	p	[228]
		Ipimorpha subtusa (Denis & Schiffermüller)	p	[228]
			p	[166]
		Melanchra persicariae (L.)	po	[94]
		Moma alpium (Osbeck)	po	[94]XVI
		Orthosia gracilis (Denis & Schiffermüller)	p	[15]
		Orthosia incerta (Hufnagel)	p	[15]
		Orthosia munda (Denis & Schiffermüller)	p	[15]
		Scoliopteryx libatrix (L.)	po	[94]
			po	[224]
			p	[166]
		Xestia c-nigrum (L.)	po	[94]XVII
		Xylena exsoleta (L.)	p	[15]XVIII
	Notodontidae	*Cerura felina* Butler	p	[4]XIX
		Cerura menciana Moore	p	[4]
			p	[166]
			po	[94]
		Clostera albosigma curtuloides (Erschoff)	po	[4]XX
		Clostera anachoreta (Fabricius)	p	[4]
			p	[166]
			po	[94]
		Clostera anastomosis (L.)	po	[94]
			p	[4]
			p	[166]
			p	[75]
		Clostera curtula canescens (Graeser)	p	[4]
		Furcula furcula lanigera (Moore)	p	[166]XXI
		Gangarides dharma Moore	po	[94]
		Gazalina chrysolopha (Kollar)	po	[94]
		Gluphisia crenata (Esper)	m	[4]XXII
		Gonoclostera timoniorum (Bremer)	po	[94]XXIII
		Harpyia langiera (Butler)	p	[4]
			po	[94]
		Harpyia umbrosa (Staudinger)	po	[94]XXIV
		Micromelalopha sieversi (Staudinger)	p	[4]XXV
			po	[94]XXV
		Neocerura wisei (Swinhoe)	p	[4]
			po	[94]

Order	Family	Species	H. R.	Ref.
		Notodonta torva (Hübner)	p	[4]XXVI
		Phalera assimilis (Bremer & Grey)	po	[94]
		Phalera bucephala (L.)	po	[94]
		Phalera flavescens (Bremer & Grey)	p	[4]
			po	[94]
		Phalera fuscescens Butler	po	[94]
		Pheosia fusiformis (Matsumura)	m	[4]
		Pterostoma griseum (Bremer)	po	[4]
		Pterostoma sinicum Moore	po	[94]
		Pygaera timon (Hübner)	mo	[4]
	Nymphalidae	*Apatura ilia* (Denis & Schiffermüller)	po	[94]
		Apatura ilia substituta Butler	mo	[94]
		Apatura iris (L.)	po	[94]
		Apatura metis Freyer	po	[94]
		Chalinga elwesi (Oberthür)	po	[219]
		Limenitis populi (L.)	po	[219]
			po	[94]
		Litinga cottini (Oberthür)	po	[219]
		Nymphalis antiopa (L.)	po	[219]
		Sumalia daraxa (Doubleday)	po	[219]
		Vanessa indica L.	po	[94]
	Pieridae	*Aporia crataegi* (L.)	po	[94]
	Psychidae	*Chalioides kondonis* Matsumura	po	[94]
		Clania minuscula Butler	po	[94]XXVII
		Clania variegata Snellen	po	[94]XXVIII
	Pyralidae	*Nephopteryx semirubella* Scopoli	po	[94]
	Saturniidae	*Actias dubernardi* Oberthür	po	[94]
		Actias heterogyna Mell	po	[94]
		Actias selene ningpoana Felder	po	[94]
		Dictyoploca japonica Moore	po	[94]
		Dictyploca japonica Moore	p	[75]
		Neoris haraldi Schawerda	po	[94]
		Rhodinia davidi Oberthür	po	[94]
	Sphingidae	*Amorpha amurensis* (Staudinger)	po	[94]
			po	[225]
			po	[227]
		Apocalypsis velox Butler	p	[225]
			po	[227]
			p	[75]
		Callambulyx tatarinovi (Bremer & Grey)	po	[94]
		Mimas tiliae christophi (Staudinger)	p	[225]
			p	[227]
			po	[94]
		Phyllosphingia dissimilis sinensis Jordan	po	[94]

Order	Family	Species	H. R.	Ref.
		Smerinthus planus Walker	po	[94]
		Smerithus caecus Ménétriès	p	[225]
			p	[227]
		Smerithus kindermanni Lederer	p	[225]
			p	[227]
		Smerithus planus alticola Clark	p	[225]
			p	[227]
		Smerithus planus Walker	p	[225]
			p	[227]
	Tortricidae	*Acleris alnivora* Oku	???	[133]
		Acleris emargana (Fabricius)	p	[133]
			po	[78]
		Acleris issikii Oku	p	[133]
			po	[78]
		Acleris submaccana (Filipjev)	p	[133]
		Adoxophyes orana Fischer von Röslerstamm	p	[75]
			p	[133]
		Ancylis unculana (Haworth)	p	[78]
		Apotomis inundana (Denis & Schiffermüller)	p	[133]
		Archips crataegana (Hübner)	p	[133]
		Archips xylosteana (L.)	p	[133]
		Capua favillaceana (Hübner)	p	[133]
		Cerace stipatana Walker	po	[94]
		Choristoneura diversana (Hübner)	p	[133]
		Cryptophlebia ombrodelta (Lower)	po	[94]
		Epinotia nisella (Clerck)	p	[133]
		Epinotia ramella (L.)	p	[133]
			p	[166]
		Gibberifera simplana (Fischer von Röslerstamm)	m	[78]
		Gypsonoma minutana (Hübner)	p	[133]
		Hedya salicella (L.)	p	[133]
		Pandemis corylana (Fabricius)	po	[94]
		Pandemis heparana (Denis & Schiffermüller)	po	[133]
			po	[94]
		Ptycholoma lecheana (L.)	p	[133]
			p	[75]
		Saliciphaga achris (Butler)	p	[133]
		Sciaphila branderiana (L.)	po	[133]
	Yponomeutidae	*Yponomeuta padella* (L.)	mo	[94]
	Zygaenidae	*Pidorus glaucopis atratus* Butler	po	[94]
Orthoptera	Oedipodidae	*Locusta migriatoria manilensis* (Meyen)	po	[94]
	Phaneropteridae	*Holochlora japonica* Bremer von Wattenwyi	po	[94]
	Pyrgomorphidae	*Atractomorpha lata* (Motschulsky)	po	[94]
Thysanoptera	Phlaeothripidae	*Acanthothrips nodicornis* (Reuter)	p	[66]

Order	Family	Species	H. R.	Ref.
	Thripidae	*Anaphothrips populi* Zhang & Tong	mo	[155]
		Neohydatothrips populi Han	m	[66]
		Scolothrips dilongicornis Han & Zhang	p	[66]
		Scolothrips takahashii Priesner	po	[66]
			p	[75]

[I]Recorded as *Potosia famelica* Janson
[II]Recorded as *Chrysolampra populi* L.
[III]Recorded as *Chrysolampra saliciwrax* Fairmaire
[IV]Recorded as *Chrysolampra vigintipunctata* (Scopoli)
[V] Possilble symonym of *Chrysomela vigintipunctata* (Scopoli)
[VI]Recorded as *Pterocomma neimogolense* Zhang
[VII]Recorded as *Brephos notha suifunensis* Kardarkoff
[VIII]Recorded as *Biston regalis comitata* (Warren)
[IX]Recorded as *Parasa consocia* Walker
[X]Recorded as *Parasa hilarata* (Staudinger)
[XI]Recorded as *Parasa lepida* (Cramer)
[XII]Recorded as *Parasa pseudorepanda* Hering
[XIII]Recorded as *Parasa repunda* Hampson
[XIV]Recorded as *Euxoa exclamationis* L.
[XV]Recorded as *Earias pudicana pupillana* Staudinger
[XVI]Recorded as *Trichosea champa* Moore
[XVII]Recorded as *Agrotis c-nigrum* L.
[XVIII]Recorded as *Xylena exoleta* (L.)
[XIX]Recorded as *Cerura vinula felina* (Butler)
[XX]Recorded as *Clostera curtuloides* Erschoff
[XXI]Recorded as *Furcula lanigera* (Butler)
[XXII]Recorded as *Gluphisia japonica* (Wileman)
[XXIII]Recorded as *Gonoclostera timonides* (Bremer)
[XXIV]Recorded as *Hybocampa umbrosa* (Staudinger)
[XXV]Recorded as *Micromelalopha troglodyta* (Graeser)
[XXVI]Recorded as *Notodonta tritophus uniformis* Oberthür
[XXVII]Recorded as *Cryptothelea minuscula* Butler
[XXVIII]Recorded as *Cryptothelea variegata* Snellen

Potamogeton crispus

Curly pondweed

Introduction

There are approximately 90 species of the genus *Potamogeton* worldwide. Twenty six species have been reported in China with a nationwide distribution[3, 4].

Taxonomy

Order: Helobiae
Suborder: Potamogetonineae
Family: Potamogetonaceae
Genus: *Potamogeton* L.
Subgenus: Potamogeton
Species: *Potamogeton crispus* L.

Description

Potamogeton crispus is a submerged freshwater perennial. It has a terete to slightly flattened rhizome. The stems are sparingly branched, also terete to slightly flattened and angular, and creeping at the base. The stiff axillary turions are 1-3 cm long and 8-15mm wide. Leaves are sessile, broadly linear to narrowly oblong, 3-8 cm long and 3-10 mm wide, mostly undulate or crispate, with serrulate margins, and obtuse or rounded apices. Stipules are 5-10 mm long, convolute to shortly connate, membranous and evanescent. Inflorescences are cylindrical spikes composed of 2-4 whorls of opposite flowers borne on peduncles up to 5 cm in length. Carpels are 4-mercous, shortly connate at the base. Fruits are ovate, 3.5-4 mm long; with a significant dorsal keels that are sparsely dentate on the lower ridge. The beak is slender, nearly equal to or longer than the body of carpel. Flowers and fruits appear from April through July[4].

Species of *Potamogeton* in China[3]

Scientific Name	Scientific Name
P. acutifolius Link	*P. manchriensis* (A. Benn) A. Benn.*
P. alpinus Balb.[I]	*P. natans* L.
P. amblyophyllus C. A. Meyer	*P. nodosus* Poir.
P. compressus L.*	*P. obtusifolius* Mert. & Koch
P. crispus L.	*P. octandrus* Poir.[III]
P. cristatus Rgl. & Maack	*P. oxyphyllus* Miq.
P. distinctus A. Benn.[II]	*P. pamiricus* Baag.
P. filiformis Pers.	*P. pectinatus* L.[IV]
P. gramineus L.	*P. perfoliatus* L.
P. intortifolius J. B. He et al.	*P. polygonifolius* Pour.
P. lucens L.	*P. praelongus* Wulf.
P. maackianus A. Benn.	*P. pusillus* L.
P. malaianus Miq.	*P. recurvatus* Hagstrom

[I]recorded as *P. heterophyllus* Schreb. in *FRPS*
[II]recorded as *P. fontigenus* Y. H. Guo et al. in *FRPS*
[III]recorded as *P. hubeiensis* W. X. Wang in *FRPS*
[IV]recorded as *P. leptanthus* Y. D. Chen and *P. nanus* Y. D. Chen in *FRPS*
*listed in the revised *FOC*

Habitat

P. crispus occurs in lakes, streams, ponds, reservoirs, paddy fields less than 2 m in depth[4, 7]. It also occurs in freshwater marshes at elevations of 2300 m in Qinghai, northwestern China[6], and 570-2300 m in Yunnan[7].

Distribution

P. crispus reportedly occurs nationwide in China with the exception of Tibet.

Economic Importance

P. crispus is regarded as green manure, and as a forage plant for fish and livestock [1, 3], as well as a common aquatic weed. It is also host to some aquatic insect pests[5]. Like many aquatic plants, *P. crispus* serves as an spawning habitat

for fish and shrimp in the early spring when flowering occurs[7].

Related Species

P. malaianus Miq., similar to *P. crispus* in appearance, is petiolate, with an undulate or distinctly serrulate margin, 7 or more veined. *P. malaianus* occurs in still or slowly running water and paddy fields. It is also a nationally distributed aquatic weed[2, 4].

Natural Enemies of *Potamogeton*

One arthropod species has been recorded as associated with plants of genus *Potamogeton*. One aquatic beetle, *Donacia provosti* Fairmaire (Coleoptera: Crioceridae), is mentioned in association with *Potamogeton*[5].

Arthropods

Order	Family	Species	H. R.	Ref
Homoptera	Aphididae	*Rhopalosiphum nymphaeae* (L.)	po	[8]

Pueraria montana var. *lobata (Pueraria lobata)*
Kudzu

Introduction
The genus *Pueraria* contains approximately 35 species, occurring in East and Southeast Asia. Eight species have been reported in China with distribution extending from northwestern and central southern into southeastern China[176, 177].

Taxonomy
Order: Rosales
Suborder: Leguminosae
Family: Leguminosae (Fabaceae)
Subfamily: Papilionideae Giseke
Tribe: Phasoleae DC.
Subtribe: Glycininae Benth.
Genus: *Pueraria* DC.
Species: *Pueraria montana* var. *lobata* (Willd.) Sanjappa & Pradeep

Description
Pueraria montana var. *lobata* is a hirsute woody vine that can grows to a height of 8 meters in China. It has a xyloid stem base, and starchy root tubers. The leaves are 3-leaflets, pinnately compound, with ovoid-oblong, vertically veined stipules. Each leaflet is 3-lobed, or occasionally entire with linear-lanceolate stipels equal to or longer than the petiolule.The terminal leaflet, 7-15 cm long and 5-12, wide is broadly to obliquely ovate. The lateral leaflets are slightly smaller, obliquely ovate, with light yellow appressed pilose hairs on the upper surface and more densely so on the underside. Racemes, about 15-30 cm in length, bear flowers mainly in the upper half of the inflorescence. The caducous bracts are linear-lanceolate to linear, and longer than the bractlets, which are ovate, less than 2 mm in length. Florets occur in cluster of three at the rachis node. Calyces are campanulate, lanceolate-lobed, 8-10 mm long, and covered with yellowish brown hairs. Corollas are purple, 10-12 mm long, with a 2-lobed, obovate flag at the base. Flowers appear from September through October, consequently followed in November to December by brownish hirsute, flat, oblong pods 5-9 cm long and 8-11 cm wide[176].

Species of *Pueraria* in China†

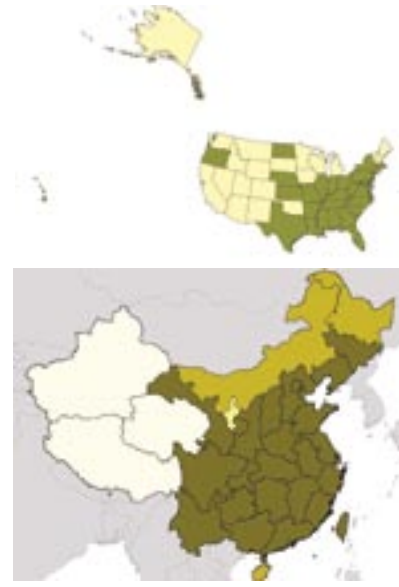
Scientific Name	Scientific Name
P. alopecuroides Craib	*P. peduncularis* (Grah. ex Benth.) Benth.
P. calycina Franch.	*P. phaseoloides* (Roxb.) Benth.
P. edulis Pampan.	*P. stricta* Kurz
P. lobata (Willd.) Ohwi‡	*P. wallichii* DC.

† Nine species are listed in the revised *FOC*.
‡ *P. lobata* (Willd.) Ohwi is commonly accepted as *Pueraria montana* var. *lobata* (Willd.) Sanjappa & Pradeep

Habitat
In general, *P. Montana* var. *lobata* occurs in dense or sparse forests in mountainous areas[176]. Additional habitats include warm, moist hillsides, roadsides, and streamsides at elevations of 700-1500 m in the Qinling Mountains, northwestern China; and broadleaf forests, forest edges, thickets, and undisturbed mountains in northeastern China[52, 82].

Distribution
The distribution of *P. montana* var. *lobata* has been reported from most of the provinces in China except Qinghai, Tibet, Xinjiang[176], and possibly Ningxia[141].

Economic Importance
The root of *P. montana* var. *lobata* is medically useful in China. The plant is a fiber source for weaving and papermaking[176]. *P. montana* is also planted for soil conservation in some areas in China[82, 88].



Related Speceis

Pueraria montana var. *montana* (Lour.) Merr, accepted as *Pueraria lobata* var. *montana* (Lour.) van der Maesen in *FRPS*, flowers from July through September and fruits from October through December. It occurs in thickets and sparsely forested mountainous areas, in the provinces of Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hubei, Hunan, Jiangxi, Sichuan, Taiwan, Yunnan, and Zhejiang[176]. *Pueraria lobata* var. *thomsonii* (Benth.) van der Maesen, also known as *Pueraria lobata* var. *thomsonii* Benth, may be listed as a separate species in the revised *Flora of China*(FOC). It occurs in thickets and sparse forests, flowering in September and fruiting in November in the provinces of Guangdong, Guangxi, Hainan, Jiangxi, Sichuan, Yunnan, and Zhejiang[177].

Natural Enemies of Pueraria

Twelve species of fungi have been reported from members of the genus *Pueraria* in China. Three Anamorphic *Mycosphaerella* species, *Cercospora puericola* W. Yamam., *Mycovellosiella puerariae* D.E. Shaw & Deighton, *Pseudocercospora puerariae* (Syd. & P. Syd.) Deighton, have been recorded only from *Pueraria montana* var. *lobata.* Forty-eight arthropod species have been found.

Fungi

Phylum	Family	Species	H. R.	Ref.
Ascomycota	Erysiphaceae	*Erysiphe puerariae* R.Y. Zheng & G.Q. Chen	po	[24]
		Pleochaeta polychaeta (Berk. & M.A. Curtis) Kimbr. & Korf	po	[26]
	Meliolaceae	*Meliola banosensis* Syd.	o	[72]
			p	[26]
	Mycosphaerellaceae	*Mycosphaerella puerariae*	o	[26]
Basidiomycota	Ceratobasidiaceae	*Thanatephorus cucumeris* (A.B. Frank) Donk	p	[26]
	Phakopsoraceae	*Phakopsora pachyrhizi* Syd. & P. Syd.	p	[26]
Chytridiomycota	Synchytriaceae	*Synchytrium minutum* (Pat.) Gäum.	oo	[26]
Anamorphic *Mycosphaerella*		*Cercospora puericola* W. Yamam.	m	[26]
		Mycovellosiella puerariae D.E. Shaw & Deighton	m	[65]
		Pseudocercospora puerariae (Syd. & P. Syd.) Deighton	m	[129]
		Pseudocercospora puerariicola (W. Yamam.) Deighton	o	[129]
Anamorphic *Pleochaeta*		*Streptopodium* spp.	po	[24]

Arthropods

Order	Family	Species	H. R.	Ref.
Coleoptera	Chrysomelidae	*Brachyphora nigrovittata* Jacoby	po	[201]
			p	[165]
		Gonioctena flexuosa (Baly)	p	[201]
		Gonioctena tredecimmaculata (Jacoby)	oo	[201]
			oo	[178]
	Crioceridae	*Sagra femorata purpurea* Lichtenstein	po	[75]
			po	[164]
	Curculionidae	*Alcidodes trifidus* (Pascoe)	p	[75]
Hemiptera	Coreidae	*Fracastorius cornutus* Distant	m	[208]
		Homoeocerus dilatatus Horváth	p	[207]
		Homoeocerus marginellus Herrich-Schäffer	p	[207]
		Homoeocerus unipunctatus (Thunberg)	p	[207]
	Lygaeidae	*Chauliops fallax* Scott	p	[207]
		Malcus elongatus Stys	m	[208]
		Malcus inconspicuus Stål	p	[207]
		Tropidothorax cruciger (Motschulsky)	p	[208]

Order	Family	Species	H. R.	Ref.
	Pentatomidae	*Cantheconidea humeralis* (Distant)	p	[208]
		Cyclopelta obscura (Lepeletier & Serville)	p	[207]
		Cyclopelta parva Distant	p	[207]
		Diplorhinus furcatus (Westwood)	p	[208]
		Megarrhamphus truncatus (Westwood)	p	[207]
		Stollia guttiger (Thunberg)	p	[207]
	Plataspidae	*Aponsila montana* (Distant)	m	[208]
		Brachyplatys punctipes Montandon	m	[208]
		Coptosoma intermedia Yang	p	[208]
			p	[75]
		Coptosoma notabilis Montandon	p	[207]
			p	[75]
		Megacopta cribraria (Fabricius)	p	[207]
		Megacopta distanti (Montandon)	p	[208]
		Megacopta horvathi (Montandon)	p	[75]
		Paracopta duodecimpunctatum (Germar)	p	[207]
		Paracopta rufiscuta Hsiao et Jen	p	[208]
Lepidoptera	Crambidae	*Lamprosema diemenalis* (Guenée)	p	[169]
		Maruca testulalis Geyer	p	[169]
			p	[166]
	Drepanidae	*Callidrepana argenteola* (Moore)	p	[178]I
	Lycaenidae	*Catochrysops panormus* (Felder)	po	[219]
		Celastrina albocaerulea Moore	p	[178]
		Celastrina argiola (L.)	p	[219]
		Celastrina argiolus (L.)	p	[178]
		Curetis acuta Moore	p	[219]
		Jamides bochus formosanus (Fruhstorfer)	p	[219]
		Lampides boeticus (L.)	p	[219]
	Noctuidae	*Mocis ancilla* (Warren)	oo	[75]
	Notodontidae	*Phalera cossioides* Walker	oo	[4]II
	Nymphalidae	*Neptis hylas luculenta* Fruhstorfer	p	[219]
		Neptis nata adipala Moore	p	[178]
		Neptis nata lutatia Fruhstorfer	p	[219]
		Neptis soma Moore	p	[219]
	Sphingidae	*Acosmeryx miskini* (Murray)	p	[225]
			p	[227]
			p	[166]
		Acosmeryx naga (Moore)	p	[225]
			p	[75]
			p	[178]
		Clanis bilineata (Walker)	po	[225]
			po	[178]
		Clanis bilibeata tsingtauica Mell	po	[75]
			po	[225]

[I]Probably the synonym of *Callidrepana patrana* (Moore)
[II]Recorded as *Phalera procera* (Felder)

Quercus acutissima
Sawtooth oak

Introduction
The genus *Quercus* contains approximately 300 species worldwide with distribution in Asia, Africa, Europe and North America. Thirty-five species are recorded in the revised *Flora of China*. Members of the genus *Quercus* grow in almost every province of the country due to their high economic value[74].

Taxonomy
Order Fagales
Family Fagaceae
Genus *Quercus* L.
Species *Quercus acutissima* Carruth

Description
Quercus acutissima is a deciduous tree that can reach a height of 30 m and a diameter of one meter. The bark is dark grayish brown with deep longitudinal fissures. Young shoots are grayish yellow with grayish yellow pubescence becoming glabrescent, and light yellow lenticels. Winter buds are conical and pubescent. The leaves, 8-19 cm long and 2-6 cm wide, may

Species of *Quercus* in China*[74, 194]

Scientific Name	Scientific Name
Q. acrodonta Seem.	*Q. marlipoensis* Hu et Cheng
***Q. acutissima* Carruth.**	*Q. mongolica* Fisch. ex Ledeb[IV]
Q. aliena Bl.	*Q. monimotricha* Hand-Mazz.
Q. aquifolioides Rehd. et Wils.	*Q. oxyphylla* (Wils.) Hand.-Mazz.
Q. baronii Skan	*Q. palustris* Muench.
Q. bawanglingensis Huang, Li et Xing	*Q. phillyraeoides* A. Gray
Q. chenii Nakal	*Q. rehderiana* Hand.-Mazz.[V]
Q. cocciferoides Hand.-Mazz.	*Q. robur* L.
Q. dentata Thunb.	*Q. semecarpifolia* Smith
Q. dolicholepis A. Camus	*Q. senescens* Hand.-Mazz.
Q. engleriana Seem.[I]	*Q. serrata* Thunb
Q. fabri Hance	*Q. setulosa* Hick. et A. Camus
Q. franchetii Skan	*Q. spinosa* David. ex Franch.[VI]
Q. griffithii Hook. F. et Thoms. ex Miq.	*Q. tarokoensis* Hayata
Q. guajavifolia Lévl.[II]	*Q. utilis* Hu et Cheng
Q. kingiana Craib	*Q. variabilis* Bl.
Q. lanata Smith[III]	*Q. yunnanensis* Franch.[VII]
Q. lodicosa E. F. Warb.	

*51 species, 14 varieties and 1 form in *FRPS*. Some species excluded from *FOC* are hybrids, or synonyms, listed below[32].

[I]recorded as *Q. kongshanensis* Y. C. Hsu et H. W. Jen and *Q. lanceolata* S. Z. Qu et W. H. Zhang in *FRPS*

[II] recorded as *Q. pannosa* Hand.-Mazz. in *FRPS*

[III] recorded as *Q. tungmaiensis* Y. T. Chang. in *FRPS*

[IV] recorded as *Q. wutaishanica* Mayr. in *FRPS*

[V] recorded as *Q. longispica* (Hand.-Mazz.) A. Camus. in *FRPS*

[VI] recorded as *Q. gilliana* Rehd. et Wils. in *FRPS*

[VII] recorded as *Q. malacotricha* A. Camus in *FRPS*

have varied morphology, but oblong elliptic is the most commonly observed shape. The leaf apex is acuminate, base rounded to broadly cuneate, margin serrate. Young upper and lower leaf surfaces are pubescent becoming sparsely pubescent along the lower leaf veins. The glabrate petiole is about 1-3 cm in length. From March to April, catkins form in the leaf axils. The cupules are 1.5 cm in length and 2-4 cm in diameter. Bractlets are subulate to ligulate, revolute with a grayish white tomentum. In September to October of the following year, *Quercus acutissima* produces ovoid to ellipsoid acorns that are 1.5-2 cm long and 1.7-2.2 cm wide [194].

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Habitat

Q. acutissima occurs on sunny slopes, in pure forests or mixed forests at elevations of 60-2200 m. in the provinces of Liaoning, Hebei, Shandong, as well as southwestern China [194].

Distribution

Q. acutissima is reported to occur in Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Liaoning, Shaanxi, Shandong, Shanxi, Sichuan,Yunnan, Zhejiang, and probably Gangsu, and southeastern Xizang provinces[74, 79].

Q. acutissima is cultivated in Taiwan[76].

Economic Importance

Q. acutissima has a ring-porous wood used for making cross ties, timbers, and furniture. The leaves can used as a food source for a silkworm that produces a type of coarse silk.It is also used as forage and as a starch source for industrial use. The acorns and bark can be used in the tanning process[194].

Related Species

Two varieties have been reported. *Q. acutissima* var. *septentrionalis* Liou, which occurs in Hebei and Shandong, has glabrous or sparsely pubescent young shoots, whereas *Q. acutissima* var. *depressinucata* H. W. Jen et R.Q.Gao, with flattened round acorns, occurs on slopes or in valleys at elevations of 150-300

m in Shandong province[74].

Natural Enemies of *Quercus*

Eighty-six species of fungi and 606 arthropods have been found in association with members of the genus *Quercus*. Most of the arthropods are regarded as pest species in China.

Fungi

Phylum	Family	Species	H. R.	Ref
Ascomycota	Asterinaceae	*Prillieuxina sinensis* Petr.	mo	[26]
	Botryosphaeriaceae	*Macrophoma fusispora* Bubák	oo	[26]
		Macrophoma suberis var. *nigromaculata* Keissl.	mo	[26]
	Capnodiaceae	*Caldariomyces fumago* Woron.	po	[26]I
		Hypocapnodium setosum (Zimm.) Speg.	po	[26]
		Neocapnodium tanakae	po	[26]
		Scorias communis W. Yamam.	po	[26]
		Triposporiopsis spinigera (Höhn.) W. Yamam.	po	[26]
	Chaetothyriaceae	*Chaetothyrium javanicum* (Zimm.) Boedijn	po	[26]II
	Coccoideaceae	*Coccodiscus quercicola* Henn.	oo	[26]
	Dermateaceae	*Gloeosporium quercuum* Miura	mo	[26]
	Erysiphaceae	*Cystotheca lanestris* (Harkn.) Sacc.	p	[24]
		Cystotheca wrightii Berk. & M.A. Curtis	oo	[24]
		Erysiphe betae (Vaňha) Weltzien	po	[26]III
		Erysiphe gracilis R.Y. Zheng & G.Q. Chen	oo	[24]
		Erysiphe sikkimensis Chona, J.N. Kapoor & H.S. Gill	po	[24]

Phylum	Family	Species	H. R.	Ref
		Microsphaera alphitoides Griffon & Maubl.	o	[24]
			p	[26]
		Microsphaera hypophylla Nevod.	o	[24]
		Phyllactinia roboris (Gachet) S. Blumer	po	[26]
			po	[24]
		Sphaerotheca lanestris Harkn.	p	[26]
		Sphaerotheca wrightii (Berk. & M.A. Curtis) Höhn.	mo	[26]
		Typhulochaeta japonica S. Ito & Hara	oo	[24]
			po	[26]
		Uncinula septata E.S. Salmon	oo	[24]
			oo	[26]
	Meliolaceae	*Asteridiella cyclobalanopsidicola* (W. Yamam.) Hansf.	po	[72]IV
		Asteridiella quercina (Hansf.) Hansf.	po	[72]V
		Irenina quercina Hansf.	mo	[26]
		Meliola cyclobalanopsina var. *cyclobalanopsina*	po	[72]
		Meliola cyclobalanopsina W. Yamam.	po	[26]
		Meliola shiiae W. Yamam.	p	[72]
		Meliola taityuensis W. Yamam.	p	[72]
			oo	[26]
		Meliola taiwaniana W. Yamam.	p	[72]
	Phyllachoraceae	*Trabutia sinensis* Arx & E. Müll.	mo	[26]
	Rhytismataceae	*Coccomyces dentatus* (J.C. Schmidt & Kunze) Sacc.	mo	[26]VI
	Rutstroemiaceae	*Lambertella guizhouensis* W.Y. Zhuang & Korf	oo	[230]
		Rutstroemia sydowiana (Rehm) W.L. White	oo	[230]
	Sclerotiniaceae	*Ciboria batschiana* (Zopf) N.F. Buchw.	mo	[26]VII
		Ciboria bolaris (Batsch) Fuckelel	oo	[230]
	Taphrinaceae	*Taphrina caerulescens* (Desm. & Mont.) Tul.	mo	[26]
	Valsaceae	*Cryptoderis quercina* Teng	oo	[26]
		Cytospora microspora (Corda) Rabenh.	oo	[26]
		Linospora conflicta (Cooke) Sacc.	oo	[26]
	Venturiaceae	*Acantharia sinensis* (Petr.) Arx	mo	[26]
Basidiomycota	Cronartiaceae	*Cronartium quercuum* (Berk.) Miyabe ex Shirai	p	[26]
	Fomitopsidaceae	*Fomitopsis castanea* Imazeki	oo	[26]VIII
		Fomitopsis pinicola (Sw.) P. Karst.	po	[26]
	Ganodermataceae	*Ganoderma applanatum* (Pers.) Pat.	po	[26]
	Hapalopilaceae	*Aurantiporus fissilis* (Berk. & M.A. Curtis) H. Jahn	po	[26]IX
		Spongipellis litschaueri Lohwag	po	[26]
	Hericiaceae	*Hericium caput-medusae* (Bull.) Pers.	mo	[26]
		Hericium cirrhatum (Pers.) Nikol.	oo	[26]X
		Hericium erinaceus (Bull.) Pers.	po	[26]
		Inonotus rheades (Pers.) Bondartsev & Singer	po	[26]
	Hymenochaetaceae	*Inonotus dryadeus* (Pers.) Murrill	po	[26]

Phylum	Family	Species	H. R.	Ref
		Inonotus gilvoides (Lloyd) Teng	oo	[26]
		Inonotus krawtzewii (Pilát) Pilát	mo	[26]
		Inonotus radiatus var. *licentii* Pilát	po	[26]
		Phellinus igniarius (L.) Quél.	po	[26]
		Phellinus pectinatus (Klotzsch) Quél.	oo	[26]XI
		Phellinus robustus (P. Karst.) Bourdot & Galzin	po	[26]
		Phellinus setulosus (Lloyd) Imazeki	po	[26]
		Phellinus torulosus (Pers.) Bourdot & Galzin	po	[26]
		Xanthochrous hispidus (Bull.) Pat.	po	[26]
	Marasmiaceae	*Armillaria mellea* (Vahl) P. Kumm.	po	[26]XII
	Microstromataceae	*Microstroma album* var. *japonicum* Henn.	oo	[26]
	Polyporaceae	*Coriolus unicolor* (Bull.) Pat.	po	[26]
		Daedaleopsis confragosa (Bolton) J. Schröt.	po	[26]
		Fomes fomentarius (L.) J.J. Kickx	po	[26]
		Laetiporus sulphureus (Bull.) Murrill	po	[26]
		Poria lacerata Murrill	oo	[26]
		Poria lurida Bres.	po	[26]
		Trametes hirsuta (Wulfen) Pilát	po	[26]
		Trametes quercina Lloyd	oo	[26]
		Trametes versicolor (L.) Lloyd	po	[26]XIII
		Truncospora truncatospora (Lloyd) S. Ito	po	[26]
	Schizoporaceae	*Schizopora paradoxa* (Schrad.) Donk	oo	[26]XIV
	Stereaceae	*Xylobolus frustulatus* (Pers.) Boidin	oo	[26]XV
		Xylobolus subpileatus (Berk. & M.A. Curtis) Boidin	oo	[26]
	Tremellaceae	*Tremella indurata* Berk. & Broome	mo	[26]
Anamorphic *Apiognomonia*		*Discula quercina* (Westend.) Arx	oo	[26]XVI
Anamorphic Ascomycetes		*Hadronema orbiculare* Syd. & P. Syd.	mo	[26]
		Monochaetia kansensis (Ellis & Barthol.) Sacc.	mo	[26]
Anamorphic *Diplocarpon*		*Marssonina martinii* (Sacc. & Ellis) Magnus	oo	[26]XVII
Anamorphic *Guignardia*		*Phyllosticta hranicensis* Petr.	m	[26]
		Phyllosticta quercus Sacc. & Speg.	mo	[26]
Anamorphic *Leptosphaeria*		*Coniothyrium quercinum* (Bonord.) Sacc.	mo	[26]
Anamorphic Mycosphaerellaceae		*Ascochyta quercus* Sacc. & Speg.	mo	[26]

[I]Recorded as *Fumago vagans* Pers
[II]Recorded as *Phaeosaccardinula javanica* (Zimm.) Yamam
[III]Recorded as *Erysiphe polygoni* DC.
[IV]Recorded as *Asteridiella cyclobalanopsicola* (Yam.) Hansf.
[V]Recorded as *Asteridiella quercina* (Hansf.) Hansf.
[VI]Recorded as *Leptothyrium quercinum* (Lasch) Sacc.
[VII]Recorded as *Stromatinia pseudotuberosa* Rehm
[VIII]Recorded as *Fomitopsis castaneus* Imaz.
[IX]Recorded as *Tyromyces fissilis* (Berk. et Curt.) Donk
[X]Recorded as *Steccherinum cirrhatum* (Pers. ex Fr.) Teng
[XI]Recorded as *Pyropolyporus pectinatus* (Kl.) Murr.
[XII]Recorded as *Armillariella mellea* (Vahl ex Fr.) Karst.

[XIII]Recorded as *Coriolus versicolor* (L. ex Fr.) Quél
[XIV]Recorded as *Poria versipora* (Pers.) Rom
[XV]Recorded as *Stereum frustulosum* (Pers) Fr
[XVI]Recorded as *Gloeosporium quercinum* West.
[XVII]Recorded as *Marssonina martinii* (Sacc. et Ell.)

Arthropods

Order	Family	Species	H. R.	Ref.
Acariformes	Tetranychidae	*Brevipalpus obovatus* Donnadieu	po	[94]
		Eutetranychus orientalis (Klein)	p	[167]
		Oligonychus ununguis (Jacobi)	p	[167]
		Tetranychus neocaledonicus André	p	[167]
		Tetranychus viennensis Zacher	po	[94]
Coleoptera	Attelabidae	*Paroplapoderus melanostictus* Fairmaire	p	[75]
		Paroplapoderus semiannulatus Jekel	p	[75]
			po	[94]
	Buprestidae	*Agrilus cyaneoniger* Saunders	po	[94]
	Cerambycidae	*Acanthocinus griseus* (Fabricius)	po	[86]
			po	[178]
		Anoplodera rubra dichroa (Blanchard)	po	[94]
			p	[178]
		Anoplophora beryllina (Hope)	oo	[150]
			o	[165]
			po	[94]
			oo	[178]
		Anoplophora chinensis (Förster)	po	[94]
		Anoplophora imitatrix (White)	po	[94]
		Anoplophora leechi (Gahan)	po	[94]
		Aphrodisium sinicum (White)	oo	[150]
			po	[94]
		Apriona germari (Hope)	po	[13]
		Aromia bungii Faldermann	po	[94]
		Asias halodendri (Pallas)	po	[94]
		Bandar pascoei (Lansberge)	po	[94]
		Batocera davidis Deyrolle	po	[94]
		Batocera horsfieldi (Hope)	p	[13]
			po	[94]
		Batocera lineolata Chevrolat	p	[165]
			po	[94]
			p	[75]
		Callipogon relictus (Semenov)	po	[13]
		Chloridolum japonicum (Harold)	m	[86]
		Chloridolum lameeri (Pic)	po	[94]
		Chlorophorus eleodes (Fairmaire)	po	[94]
		Chlorophorus miwai Gressitt	po	[94]
		Chlorophorus moupinensis (Fairmaire)	po	[94]
		Chlorophorus separatus Gressitt	mo	[150]
			po	[94]
		Chlorophorus sexmaculatus (Motschulsky)	po	[94]
			p	[75]
		Dere thoracica White	p	[13]
			po	[94]
		Dorysthenes hügelii Redtenbacher	po	[86]
		Embrik-strandia unifasciata (Ritsema)	po	[94]
		Eurypoda antennata Saunders	p	[150]
			po	[94]

Order	Family	Species	H. R.	Ref.
		Gracilia minuta Fabricius	po	[13]
		Lamiomimus gottschei Kolbe	po	[13]
			po	[94]
			p	[75]
		Leptura aethiops Poda	po	[13]
		Linda apicalis Pic	oo	[165]
		Macrotoma fisheri Waterhouse	po	[13]
			po	[94]
			po	[178]
		Mallambyx raddei (Blessig)	p	[13]
			p	[94]
		Megopis sinica White	po	[13]
		Mesosa longipennis Bates	po	[13]
		Moechotypa diphysis (Pascoe)	oo	[13]
			po	[94]
		Monochamus guerryi Pic	po	[150]
			o	[165]
			po	[94]
		Monochamus sparsutus Fairmaire	mo	[94]
		Morimospasma paradoxum Ganglbauer	po	[86]
		Olenecamptus octopustulatus Motschulsky	po	[94]
		Oupyrrhidium cinnabarinum (Blessig)	oo	[150]
		Perissus laetus Lameere	p	[86]
			po	[94]
		Plagionotus pulcher Blessig	po	[13]
		Polyzonus fasciatus (Fabricius)	po	[94]
		Pseudaeolesthes chrysothrix (Bates)	po	[13]
		Purpuricenus petasifer Fairmaire	po	[94]
		Purpuricenus sideriger Fairmaire	po	[150]
			mo	[94]
		Rhaphuma horsfieldi (White)	p	[165]
		Rosalia lameerei Brongniart	p	[207]
			p	[165]
		Stenygrinum quadrinotatum Bates	po	[13]
			oo	[165]
			po	[94]
		Strangalia attenuata (L.)	p	[86]
		Strangalia basiplicata (Fairmaire)	m	[75]
		Stromatium longicorne (Newman)	p	[13]
		Thermistis croceocincta (Saunders)	po	[94]
		Toxotus meridianus (L.)	p	[86]
		Trichoferus guerryi (Pic)	mo	[86]
		Xylotrechus magnicollis (Fairmaire)	oo	[150]
			po	[94]
		Xylotrechus rusticus (L.)	p	[13]
		Xystrocera globosa (Olivier)	po	[94]
	Cetoniidae	*Agestrata orichalca* (L.)	po	[143]
		Anomalocera olivacea (Janson)	po	[143]
		Anomalocera parryi Westwood	po	[143]
		Anthracophora rusticola Burmeister	p	[143]
		Campsiura insignis (Gestro)	po	[143]
		Campsiura javanica (Gory & Percheron)	po	[143]
		Campsiura mirabilis (Faldermann)	po	[75]
		Campsiura ochreipennis (Fairmaire)	po	[143]
			po	[165]
		Campsiura superba (Van de Poll)	po	[143]

Order	Family	Species	H. R.	Ref.
		Campsiura xanthorrhina Hope	po	[143]
		Cetonia rutilans (Janson)	po	[143]
		Clinteria ducalis White	p	[143]
		Clinterocera mandarina (Westwood)	oo	[165]I
		Coelodera penicillata Hope	p	[143]
		Coenochilus nitidus Arrow	po	[143]
		Cosmiomorpha modesta Saunders	p	[94]
			po	[75]
		Cosmiomorpha setulosa Westwood	oo	[143]
			po	[165]
			po	[94]
			po	[75]
		Cosmiomorpha similis Fairmaire	po	[143]
		Cymophorus pulchellus Arrow	po	[143]
		Dicranobia potanini (Kraatz)	oo	[165]
		Dicranocephalus adamsi (Pascoe)	po	[143]
			po	[165]
			mo	[94]
		Dicranocephalus bowringi Pascoe	po	[94]
		Dicranocephalus dabryi Auzoux	po	[143]
			p	[165]
		Dicranocephalus wallichi bowringi Pascoe	po	[143]
		Dicranocephalus wallichi Hope	po	[143]
		Euchloropus laetus Fabricius	po	[143]
		Euselates ornata (Saunders)	po	[143]
		Euselates pulchella (Gestro)	p	[143]
		Euselates quadrilineata (Hope)	p	[143]
			po	[75]
		Euselates schönfeldti Kraatz	po	[143]
		Euselates tonkinensis Moser	po	[143]
		Glycyphana fulvistemma Motschulsky	po	[143]
			po	[165]
			po	[94]
		Glycyphana horsfieldi (Hope)	p	[143]
			p	[165]
			po	[75]
		Glycyphana nepalensis Kraatz	po	[143]
			po	[165]
		Goliathopsis velutinus Pouillaude	po	[143]
		Heterorrhina punctatissima Westwood	po	[143]
		Iumnos ruckeri Saunders	p	[143]
		Ixorida mouhoti (Wallace)	po	[143]
		Meroloba suturalis (Snellen)	po	[143]
		Moseriana brevipilosa Ma	po	[143]
		Moseriana longipilosa Ma	po	[143]
		Moseriana rugulosa Ma	po	[143]
		Mycteristes microphyllus Wood-Mason	po	[143]
			oo	[165]
		Neophaedimus auzouxi Lucas	oo	[143]
		Neophaedimus castanus Ma	po	[143]
		Oxycetonia bealiae (Gory & Percheron)	po	[143]
			po	[165]
			po	[178]
			po	[75]

Order	Family	Species	H. R.	Ref.
		Oxycetonia jucunda (Faldermann)	po	[143]
			po	[165]
			po	[94]
			po	[75]
		Parapilinurgus variegatus Arrow	po	[143]
		Poecilophilides rusticola (Burmeister)	po	[94]
		Protaetia aerata (Erichson)	p	[143]
		Protaetia andamanarum Janson	po	[143]
		Protaetia brevitarsis (Lewis)	po	[143]
			po	[94]
			po	[94]
		Protaetia famelica Janson	po	[143]
			po	[165]II
		Protaetia fusca (Herbst)	po	[143]
		Protaetia lugubris orientalis Medvedev	po	[165]III
		Protaetia nitididorsis (Fairmaire)	po	[143]
			po	[165]IV
			po	[75]
		Pseudodiceros nigrocyaneus (Bourgoin)	po	[143]
		Rhomborrhina fortunei (Saunders)	po	[143]
			p	[178]
			po	[75]
		Rhomborrhina fulvopilosa (Moser)	po	[75]
		Rhomborrhina fuscipes Fairmaire	po	[143]
			oo	[165]
		Rhomborrhina japonica (Hope)	oo	[165]
			po	[94]
			po	[75]
		Rhomborrhina nigra Saunders	po	[143]
		Rhomborrhina olivacea (Janson)	po	[75]
		Rhomborrhina parryi Westwood	oo	[165]
		Rhomborrhina unicolor Motschulsky	po	[143]
		Rhomborrhina yunnana Moser	oo	[143]
			po	[165]
		Taeniodera coomani (Bourgoin)	po	[143]
		Taeniodera flavofasciata (Moser)	po	[143]
			po	[75]
		Taeniodera garnieri (Bourgoin)	po	[143]
		Taeniodera idolica Janson	po	[143]
		Taeniodera malabariensis (Gory & Percheron)	po	[75]
		Thaumastopeus nigritus (Fröhlich)	p	[143]
		Torynorrhina fulvopilosa (Moser)	oo	[143]
		Torynorrhina hyacinthina (Hope)	po	[143]
		Trigonophorus nepalensis Hope	po	[143]
		Trigonophorus rothschildi Fairmaire	po	[143]
		Trigonophorus rothschildi varians (Bourgoin)	po	[75]
	Chrysomelidae	*Cneorane cariosipennis* Fairmaire	mo	[94]
		Exosoma flaviventris (Motschulsky)	mo	[94]
		Meristoides grandipennis (Fairmaire)	mo	[94]
		Mimastra limbata Baly	po	[94]
		Oides tarsatus (Baly)	po	[94]
		Pseudespera sericea Chen, Wang & Jiang	oo	[165]
		Pseudodera xanthospila Baly	mo	[94]
	Crioceridae	*Sagra fulgida janthina* Chen	po	[94]
	Curculionidae	*Alcidodes waltoni* (Boheman)	po	[94]
		Chlorophanus grandis Roelofs	mo	[94]

Order	Family	Species	H. R.	Ref.
		Cryptoderma fortunei Waterhouse	po	[94]
		Curculio arakawai Matsumura & Kono	po	[94]
		Curculio davidi Fairmaire	po	[94]
		Curculio distinguedus Roelofs	po	[94]
		Ectatorrhinus adamsi Pascoe	po	[94]
		Episomus chinensis Faust	p	[178]
		Eumyllocerus sectator (Reitter)	po	[211]
		Macrocorynus fortis (Reitter)	m	[6, 211]
		Macrocorynus psittacinus Redtenbacher	po	[6, 211]
			po	[94]
		Myllocerinus ochrolineatus Voss	po	[94]
		Neomyllocerus hedini (Marshall)	p	[6, 211]
			po	[94]
			p	[75]
		Styanax apicatus Heller	po	[94]
	Eumolpidae	*Basilepta sinarum* Weise	po	[164]
		Cleoporus variabilis (Baly)	p	[164]
			p	[165]
			po	[94]
			p	[75]
		Coptocephala asiatica chûjô	mo	[94]
		Cryptocephalus bipunctatus cautus Weise	mo	[164]
		Cryptocephalus cunctatus Clavareau	p	[164]
		Cryptocephalus luteosignatus Pic	po	[164]
		Cryptocephalus pustulipes Ménétriès	p	[164]
		Cryptocephalus regalis Gebler	po	[94]
		Cryptocephalus tetradecaspilotus Baly	po	[94]
		Demotina albomaculata Tan	m	[165]
		Demotina bicoloriceps Tan	oo	[165]
		Demotina fasciculata Baly	p	[164]
		Trichochrysea japana (Motschulsky)	po	[94]
		Xanthonia collaris Chen	po	[165]
	Hispidae	*Dactylispa angulosa* (Solsky)	po	[94]
			po	[75]
		Dactylispa excisa (Kraatz)	po	[94]
		Dactylispa subquadrata (Baly)	po	[94]
	Lucanidae	*Dorcus antaeus* Hope	oo	[165]
		Dorcus nepalensis Hope	mo	[94]
		Dorcus reichei Hope	po	[165]
		Dorcus tityus (Hope)	po	[165]
		Lucanus parryi Boileau	po	[165]
		Neolucanus championi Parry	p	[75]
		Neolucanus sinicus Saunders	p	[75]
		Odontolabis cuvera Hope	p	[178]
			p	[75]
		Odontolabis siva (Hope & Westwood)	p	[178]
			po	[75]
		Prosopocoilus astacoides Hope	p	[165]
		Prosopocoilus blanchardi Parry	p	[94]
			p	[75]
		Serrognathus titanus Boisduval	p	[75]
	Melolonthidae	*Autoserica japonica* Motschulsky	po	[94]
		Holotrichia diomphalia Bates	po	[94]
		Holotrichia trichophora (Fairmaire)	po	[94]
	Rutelidae	*Adoretosoma elegans* Blanchard	po	[94]
		Adoretus tenuimaculatus Waterhouse	po	[94]

Order	Family	Species	H. R.	Ref.
		Anomala corpulenta Motschulsky	po	[94]
		Anomala mongolica Faldermann	mo	[94]
		Anomala rufithorax Ohans	mo	[94]
		Callistethus plagiicollis Fairmaire	mo	[94]
		Ectinohoplia rufipes Motschulsky	po	[94]
		Mimela splendens (Gyllenhal)	po	[94]
		Popillia pustulata Fairmaire	po	[94]
		Popillia quadriguttata (Fabricius)	po	[94]
	Scolytidae	*Acanthotomicus spinosus* Blandford	m	[165]
		Ambrosiodmus rubricollis (Eichhoff)	p	[75]
		Cnestus maculatus Browne	p	[75]
		Coptodryas perparvus (Sampson)	p	[75]
		Euwallacea interjectus (Blandford)	p	[75]
		Hadrodemius armorphus (Eggers)	p	[75]
		Indocryphalus intermedius (Sampson)	oo	[165]
		Scolytoplatypus raja Blandford	p	[75]
		Scolytus querci Yin & Huang	oo	[197]
			oo	[165]
		Sphaerotrypes imitans Eggers	m	[197]
			o	[165]
		Sphaerotrypes yunnanensis Tsai & Yin	oo	[197]
		Terminalinus cristatus (Schedl)	p	[75]
		Trypodendron lineatum Olivier	po	[94]
		Xyleborus amorphus Eggers	po	[197]
		Xyleborus apicalis Blandford	po	[197]
		Xyleborus armipennis Schedl	po	[197]
		Xyleborus brevis Eichhoff	po	[197]
		Xyleborus dispar Fabricius	po	[197]
		Xyleborus emarginatus Eichhoff	po	[197]
			po	[94]
			p	[75]
		Xyleborus germanus (Blandford)	po	[197]
			p	[75]
		Xyleborus lewisi Blandford	po	[197]
		Xyleborus mancus formosanus Eggers	po	[197]
		Xyleborus saxeseni Ratzeburg	po	[197]
		Xyleborus seriatus Blandford	po	[197]
	Trichiidae	*Paratrichius duplicatus* Lewis	p	[143]
		Paratrichius pauliani Tesar	oo	[165]
		Paratrichius septemdecimguttatus (Snellen)	po	[165]
			p	[143]
		Trichius bifasciatus Moser	po	[75]
		Trichius dubernardi Pouillaude	po	[143]
			po	[165]
	Valgidae	*Dasyvalgus laliganti* (Fairmaire)	po	[143]
		Dasyvalgus sellatus (Kraatz)	po	[143]
		Oreoderus crassipes Arrow	po	[143]
		Oreoderus momeitensis Arrow	po	[143]
		Oreoderus quadricarinatus Arrow	po	[143]
Hemiptera	Acanthosomatidae	*Acanthosoma forficula* Jakovlev	p	[94]
		Anaxandra levicornis Dallas	po	[94]
		Elasmucha ferrugata (Fabricius)	p	[155]
		Sastragala esakii Hasegawa	p	[208]
			po	[94]
		Sastragala parmata Distant	p	[208]
	Coreidae	*Cletus rusticus* Stål	p	[75]

Order	Family	Species	H. R.	Ref.
		Dalader planiventris (Hsiao)	po	[208]
		Mictis fuscipes Hsiao	mo	[94]
		Mictis tenebrosa (Fabricius)	po	[207]
		Notopteryx soror Hsiao	po	[208]
		Ochrochira ferruginea Hsiao	p	[208]
		Petillopsis calcar Dallas	p	[208]
		Pterygomia humeralis Hsiao	p	[208]
			mo	[94]
		Trematocoris insignis (Hsiao)	p	[208]
	Pentatomidae	*Aspongopus chinensis* Dallas	po	[94]
		Axiagastus rosmaus Dallas	m	[207]
		Dalpada cinctipes Walker	po	[75]
		Eurostus grossipe Dallas	po	[75]
		Eurostus ochraceus Montandon	p	[208]
		Eurostus validus Dallas	p	[207]
			po	[94]
			p	[75]
		Eusthenes cupreus (Westwood)	po	[75]
		Graphosoma rubrolineata (Westwood)	p	[207]
			po	[94]
		Halyomorpha halys (Stål)	po	[75]
		Homalogonia obtusa (Walker)	p	[208]
			po	[94]
			p	[75]
		Mattiphus splendidus Distant	p	[208]
		Megarrhamphus truncatus (Westwood)	p	[207]
			m	[94]
		Menida formosa (Westwood)	po	[208]
		Palomena angulosa Motschulsky	p	[207]
		Paterculus elatus (Yang)	p	[75]
		Pentatoma japonica (Distant)	po	[207]
		Pentatoma rufipes (L.)	po	[207]
			po	[94]
		Poecilocoris dissimilis Martin	p	[207]
		Poecilocoris lewisi (Distant)	po	[94]
			po	[75]
		Poecilocoris sanszesignatus Yang	po	[207]
		Poecilocoris splendidulus Esaki	po	[207]
		Prionaca hubeiensis Zhang & Lin	mo	[94]
		Tessaratoma papillosa (Drury)	po	[94]
		Udonga spinidens Distant	p	[207]
			p	[94]
	Plataspidae	*Coptosoma lasciva* Bergroth	p	[208]
		Coptosoma variegata Herich-Schaeffer	po	[207]
			po	[75]
		Megacopta hui (Yang)	m	[208]
	Tingidae	*Corythucha arcuata* (Sty)	po	[94]
		Uhlerites debilis (Uhler)	p	[208]
	Urostylidae	*Urochela distincta* Distant	po	[94]
		Urochela yangi Maa	mo	[94]
		Urostylis lateralis Walker	mo	[208]
Homoptera	Aetalionidae	*Darthula hardwicki* (Gray)	oo	[165]
	Aphididae	*Myzocallis kuricola* Motschulsky	po	[94]
	Asterolecaniidae	*Asterodiaspis japonica* (Cockerell)	po	[173]
	Callaphididae	*Diphyllaphis quercus* (Takahashi)	m	[75]
		Tuberculatus capitatus (Essig & Kuwana)	o	[205]

Order	Family	Species	H. R.	Ref.
		Tuberculatus fulviabdominalis (Shinji)	oo	[205]
		Tuberculatus japonicus radisectuae G. X. Zhang & W. Y. Zhang	m	[75]
		Tuberculatus stigmatus (Matsumura)	oo	[205]
	Cicadellidae	*Drabescus nigrifemoratus* (Matsumura)	po	[57]
		Eurhadina alba Dworakowska	m	[155]
		Ledra auditura Walker	p	[57]
		Petalocephala discolor Uhler	p	[57]
		Tettigoniella albomarginata (Signoret)	p	[57]
	Cicadidae Coccidae	*Cryptotympana atrata* (Fabricius)	p	[178]
		Eulecanium ciliatum (Douglas)	po	[173]
		Parasaissetia nigra (Nietner)	po	[173]
		Saissetia oleae (Bernard)	p	[173]
	Diaspididae	*Fiorinia fioriniae* (Targioni-Tozzetti)	po	[94]
		Fiorinia vacciniae Kuwana	po	[94]
		Lepidosaphes beckii (Newman)	po	[94]
		Lepidosaphes corni (Takahashi)	po	[94]
		Lepidosaphes tubulorum Ferris	po	[165]
			po	[94]
		Pseudaonidia duplex (Cockerell)	po	[94]
	Fulgoridae	*Lycorma delicatula* (White)	p	[220]
			p	[165]
	Greenideidae	*Eutrichosiphum izas* Zhang	po	[165]
		Eutrichosiphum pasaniae (Okajima)	p	[178]
		Eutrichosiphum tattakanum (Takahashi)	p	[165]
		Greenidea hangnigra Zhang	m	[205]V
			m	[113]V
			o	[165]
		Holotrichosiphon dubius yulongshanense Zhang	m	[165]
		Holotrichosiphon russallee lijiangense Zhang	m	[165]
	Lachnidae	*Lachnus roboris* (L.)	mo	[205]
		Lachnus siniquercus Zhang	mo	[205]
		Lachnus tropicalis (van der Goot)	p	[205]
			po	[94]
			p	[178]
			p	[75]
	Lecanodiaspididae	*Crescoccus candidus* Wang	po	[173]
		Lecanodiaspis circularis (Borchsenius)	oo	[173]
		Pseudopulvinaria sikkimensis Atkinson	po	[173]
		Psoraleococcus costatus Borchsenius	po	[173]
	Margarodidae	*Drosicha corpulenta* (Kuwana)	po	[94]
	Membracidae	*Jingkara hyalipunctata* Chou	oo	[165]
			po	[94]
			p	[75]
		Tricentrus aleuritis Chou	oo	[165]
			p	[75]
	Pseudococcidae	*Drymococcus rhizophilus* Borchsenius	oo	[172]
		Physeriococcus cellulosus Borchsenius	po	[172]
	Thelaxidae	*Cervaphis quercus* Takahashi	o	[205]
			oo	[94]
		Kurisakia querciphila Takahashi	o	[205]
Hymenoptera	Cynipidae	*Diplolep agana* Hart	mo	[94]VI
		Dryocosmus kuriphilus Yasumatsu	po	[94]
Isoptera	Rhinotermitidae	*Reticulitermes chinensis* Snyder	po	[94]
Lepidoptera	Aegeriidae	*Conopia quercus* Matsumura	mo	[94]
	Amathusiidae	*Stichophthalma howqua* (Westwood)	po	[94]

Order	Family	Species	H. R.	Ref.
	Arctiidae	*Camptoloma interiorata* (Walker)	p	[44]
				[45]
			po	[94]
			p	[75]
		Cyana phaedra (Leech)	po	[94]
		Hyphantria cunea (Drury)		[45]
		Rhyparioides amurensis (Bremer)	p	[44]
				[45]
			p	[166]
			po	[94]
	Bombycidae	*Oberthueria falcigera* Butler	po	[226]
		Oberthüria caeca Oberthür	p	[166]
			p	[75]
		Theophila mandarina Moore	po	[226]
			po	[94]
	Brahmaeidae	*Brahmaea certhia* Fabricius	po	[94]
		Brahmaea hearseyi (White)	p	[75]
	Cossidae	*Holcocerus vicarius* Walker	po	[94]
			p	[178]
		Xyleutes leuconotus (Walker)	po	[94]
		Zeuzera leuconotum Butler	po	[94]VII
	Crambidae	*Diaphania angustalis* (Snellen)	mo	[94]
		Sylepta balteata(Fabricius)	p	[169]
	Drepanidae	*Agnidra scabiosa fixseni* (Bryk)	po	[94]VIII
		Drepana dispilata Warren	mo	[94]
		Nordstromia japonica (Moore)	po	[94]
			p	[178]
		Palaedrepana harpagula (Esper)	po	[94]
			p	[178]
			p	[78]
		Pseudalbara parvula (Leech)	po	[94]
			p	[178]
			p	[75]
	Gelechiidae	*Chelaria gibbosella* Zeller	po	[78]
	Geometridae	*Acasis viretata* (Hübner)	po	[195]
		Asthena nymphaeata (Staudinger)	oo	[195]
		Biston betularia (L.)	po	[94]
		Boarmia displiscens Butler	po	[94]
			p	[178]
		Buzura suppressaria (Guenée)	po	[94]
			p	[178]
			p	[75]
		Colotois pennaria ussuriensis O. Bang-Haas	p	[78]
		Comibaena delicator Warren	mo	[94]
			p	[178]
			m	[78]
		Comibaena pictipennis Butler	m	[94]
		Conchia mundataria Cramer	po	[161]
		Culcula panterinaria (Bremer & Grey)	po	[94]
		Deileptenia ribeata Clerck	po	[94]
			p	[178]
			p	[78]
		Electrophaes corylata (Thunberg)	po	[195]
		Erannis dira Butler	p	[78]
		Esakiopteryx volitans (Butler)	po	[195]

Order	Family	Species	H. R.	Ref.
		Garaeus parva distans Warren	po	[161]
			po	[94]
		Gelasma glaucaria (Walker)	oo	[161]
		Hemistola tenuilinea (Alphéraky)	oo	[161]
		Hemithea aestivaria Hübner	po	[161]
			p	[78]
		Hipparchus valida Felder	po	[161]
			mo	[94]
			p	[78]
		Hypomecis punctinalis conferenda (Butler)	p	[178]
			p	[75]
		Idiotephria debilitata (Leech)	oo	[195]
		Inurois fletcheri Inoue	po	[78]
		Jodis lactearia (L.)	p	[178]
			p	[78]
		Larerannis filipjevi Wehrli	mo	[78]
		Mixochlora vittata (Moore)	po	[178]
		Ochrognesia difficta (Walker)	po	[161]
			p	[178]
			p	[75]
		Operophtera brumata (L.)	po	[195]
		Operophtera fagata (Scharfenberg)	po	[195]
		Operophtera relegata Prout	po	[195]
		Ourapteryx aristidaria Oberthür	mo	[94]IX
		Ourapteryx nivea Butler	po	[94]
			po	[178]
			po	[78]
		Ourapteryx sambucaria L.	po	[94]
		Photoscotosia atrostrigata (Bremer)	po	[94]
		Phthonosema invenustaria Leech	po	[94]
		Selenia tetralunaria Hufnagel	po	[161]
			p	[78]
		Serraca punctinalis conferenda Butler	p	[78]
		Tanaorhinus rafflesi rafflesi Moore	p	[178]
		Tanaorhinus reciprocata confuciaria Walker	mo	[94]
			p	[78]
		Trichopteryx hemana (Butler)	p	[195]
		Trichopteryx terranea (Butler)	oo	[195]
		Trichopteryx ustata (Christoph)	oo	[195]
		Xanthabraxas hemionata (Guenée)	p	[178]
			p	[75]
	Lasiocampidae	*Cyclophragma lineata* (Moore)	po	[94]
		Cyclophragma undans (Walker)	po	[94]
		Cyclophragma undans fasciatella Ménétriès	po	[94]
		Cyclophragma xichangensis (Tsai & Liu)	p	[166]
		Cyclophragma yamadai (Nagano)	po	[94]
		Gastropacha populifolia Esper	po	[94]
		Lebeda nobilis Walker	po	[94]
		Malacosoma neustria testacea Motschulsky	po	[94]
		Odonestis pruni L.	po	[94]
		Paralebeda plagifera femorata (Ménétriès)	p	[178]
		Paralebeda plagifera Walker	po	[166]
			p	[178]
		Trabala vishnou Lefebure	po	[94]
			p	[178]
	Limacodidae	*Apoda dentatus* Oberthür	p	[78]

Order	Family	Species	H. R.	Ref.
		Cnidocampa flavescens (Walker)	po	[94]
		Latoia consocia Walker	po	[94]X
		Latoia hilarata (Staudinger)	p	[75]
			p	[78]XI
		Narosa edoensis Kawada	p	[78]
		Narosoideus flavidorsalis (Staudinger)	po	[94]
		Phocoderma velutina Kollar	p	[94]
			p	[75]
			p	[78]
		Setora postornata (Hampson)	po	[94]
		Thosea sinensis (Walker)	po	[94]
	Lycaenidae	*Acytolepis puspa* (Horsfield)	po	[219]
		Antigius attilia (Bremer)	oo	[178]
			o	[219]
		Arhopala japonica (Murray)	po	[219]
		Arhopala rama Kollar	p	[178]
		Celastrina argiola (L.)	po	[219]
		Chrysozephyrus kabrua niitakanus (Kano)	mo	[219]
		Chrysozephyrus lingi Okano et Ohkura	mo	[219]
		Chrysozephyrus rarasana (Mutsumura)	oo	[219]
		Euaspa milionia formosana Nomura	mo	[219]
		Favonius orientalis (Murray)	o	[219]
		Japonica lutea (Hewitson)	p	[219]
		Japonica saepestriata (Hewitson)	o	[219]
		Leucantigius atayalicus (Shirôzu & Murayama)	oo	[219]
		Niphanda fusca (Bremer & Grey)	po	[94]
			oo	[178]
		Shirozua jonasi (Janson)	p	[219]
		Strymonidia w-album (Knoch)	po	[94]
		Teratozephyrus arisanus (Wileman)	mo	[219]
		Teratozephyrus hecale (Leech)	mo	[219]
	Lymantriidae	*Arctornis alba* (Bremer)	po	[212]
			po	[94]
			p	[178]
			p	[75]
		Arctornis gelasphora Collenette	po	[94]
		Arctornis l-nigrum (Müller)	p	[212]
			p	[166]
			po	[94]
			p	[75]
		Arctornis xanthochila Collenette	p	[166]
			p	[178]
		Aroa substrigosa Walker	po	[94]
		Cispia lunata Chao	oo	[213]
		Dasychira acerosa Chao	m	[166]
		Dasychira angulata Hampson	m	[166]
			mo	[94]
			m	[75]
		Dasychira aurifera Scriba	mo	[212]
			m	[178]
			m	[75]
		Dasychira chinensis Swinhoe	p	[75]
		Dasychira conjuncta Wileman	m	[212]
			po	[94]
		Dasychira lunulata Butler	p	[212]
			p	[178]

Order	Family	Species	H. R.	Ref.
		Dasychira olga (Oberthür)	p	[212]
		Dasychira pseudabietis (Butler)	p	[212]
		Dasychira pudibunda (L.)	p	[212]
		Euproctis bipunctapex (Hampson)	po	[94]
			p	[75]
		Euproctis chrysorrhoea (L.)	p	[212]
		Euproctis diploxutha Collenette	po	[94]
			p	[75]
		Euproctis flava (Bremer)	p	[212]
			po	[94]
			p	[178]
			p	[75]
		Euproctis plana Walker	m	[212]
			po	[94]
			p	[75]
		Ivela ochropoda (Eversmann)	po	[94]
		Lymantria dispar (L.)	p	[212]
			p	[166]
			po	[94]
			p	[178]
		Lymantria dispar japonica Motschulsky	po	[94]
		Lymantria dissoluta Swinhoe	po	[94]
			p	[178]
		Lymantria marginata Walker	po	[94]
		Lymantria mathura Moore	p	[212]
			p	[166]
			po	[94]
			po	[94]
			p	[178]
		Lymantria monacha (L.)	p	[212]
			po	[94]
		Lymantria viola Swinhoe	p	[166]
		Orgyia antiqua (L.)	p	[212]
		Orgyia dubia (Tauscher)	po	[212]
		Orgyia gonostigma (L.)	p	[212]
			po	[94]
			p	[75]
		Orgyia thyellina Butler	p	[212]
		Pida strigipennis (Moore)	po	[213]
			po	[94]
		Porthesia scintillans (Walker)	po	[94]
			p	[75]
		Porthesia similis (Fueszly)	p	[212]
			po	[94]
			p	[178]
			p	[75]
		Teia ericae Germar	p	[212]
			p	[213]
			po	[94]
		Teia gonostigma (L.)	p	[213]
	Noctuidae	*Acronicta aceris* (L.)	po	[15]
		Acronicta leporina (L.)	po	[15]XII
		Acronicta tridens (Denis & Schiffermüller)	po	[15]
		Agrotis segetum (Denis & Schiffermüller)	p	[166]

Order	Family	Species	H. R.	Ref.
		Amphipyra perflua (Fabricius)	po	[224]
			p	[166]
			po	[94]
		Amphipyra pyramidea (L.)	po	[94]
		Bena bicolorana (L.)	m	[228]
		Bena prasinana (L.)	po	[94]XIII
			p	[178]XIII
		Diphtherocome pallida (Moore)	po	[94]XIV
		Diphtherocome vivida (Leech)	po	[94]
		Dysgonia stuposa (Fabricius)	p	[94]XV
		Ephesia dissimilis (Bremer)	mo	[224]
			mo	[166]
			po	[94]XVI
			mo	[75]
		Ephesia streckeri (Staudinger)	mo	[224]
			mo	[75]
		Grammodes stolida (Fabricius)	po	[224]XVII
		Hyblaea puera Cramer	p	[94]
		Hypersypnoides astrigera (Butler)	mo	[94]XVIII
		Hypersypnoides punctosa (Walker)	mo	[94]XIX
		Hypocala moorei Butler	po	[94]
		Hypocala subsatura Guenée	p	[166]
			po	[94]
			p	[75]
		Lacanobia contigua (Denis & Schiffermüller)	po	[224]XX
			p	[166]
		Moma alpium (Osbeck)	po	[224]XXI
			p	[166]
			po	[94]XXII
			m	[178]
			p	[75]
		Mormonia dula (Bremer)	oo	[224]
		Orthosia incerta (Hufnagel)	p	[15]
		Orthosia munda (Denis & Schiffermüller)	p	[15]
		Polia thalathina (Rottenburg)	p	[15]
		Prodenia litura (Fabricius)	po	[94]
		Pseudoips sylpha (Butler)	m	[15]XXIII
			po	[94]XXIII
		Sypnoides picta Butler	po	[228]XXIV
			po	[166]XXIV
			mo	[94]XXIV
		Sypnoides simplex (Leech)	mo	[94]XXV
		Xylena exsoleta (L.)	p	[15]XXVI
	Notodontidae	*Cnethodonta grisescens* Staudinger	po	[94]
		Ellida viridimixta (Bremer)	mo	[4]XXVII
		Euhampsonia cristata (Butler)	po	[4]XXVIII
			mo	[166]XXIX
			po	[94]XXVIII
			po	[75]XXIX
		Euhampsonia niveiceps (Walker)	mo	[94]
		Euhampsonia splendida (Oberthür)	mo	[4]
			po	[94]

Order	Family	Species	H. R.	Ref.
		Fentonia ocypete (Bremer)	p	[4]
			p	[166]
			po	[94]
			p	[178]
			p	[75]
		Gazalina apsara (Moore)	oo	[166]
		Gazalina chrysolopha (Kollar)	po	[94]
		Harpyia umbrosa (Staudinger)	p	[4]XXX
			po	[94]XXX
			p	[75]
		Hexafrenum leucodera (Staudinger)	p	[75]
		Mesophalera sigmata (Butler)	o	[4]
			p	[178]
			p	[75]
		Phalera assimilis (Bremer & Grey)	p	[4]
			oo	[166]
			po	[94]
		Phalera bucephala (L.)	po	[94]
		Phalera flavescens (Bremer & Grey)	po	[4]
			po	[94]
			po	[75]
		Phalera fuscescens Butler	po	[94]
		Phalerodonta bombycina (Oberthür)	p	[4]XXXI
			mo	[94]XXXII
		Quadricalcarifera fasciata (Moore)	po	[4]
			po	[178]
			oo	[75]
		Semidonta biloba (Oberthür)	o	[4]
		Spatalia dives Oberthür	po	[75]
		Spatalia doerriesi Graeser	mo	[166]
			mo	[178]
			po	[75]
		Spatalia plusiotis (Oberthür)	po	[75]
		Stauropus persimilis Butler	p	[4]
		Togepteryx velutina (Oberthür)	po	[94]
	Nymphalidae	*Euthalia nara omeia* Leech	po	[178]
		Euthalia nara pacifica Mell	po	[178]
		Euthalia patala (Kollar)	oo	[219]
		Euthalia pratti Leech	m	[178]
		Sephisa chandra (Moore)	oo	[178]
		Sephisa daimio Matsumura	oo	[219]
		Sephisa princeps (Fixsen)	m	[178]
	Papilionidae	*Papilio bianor* Sonan	po	[94]
	Psychidae	*Chalia larminati* Heylaerts	p	[166]
		Clania minuscula Butler	po	[94]XXXIII
		Clania variegata Snellen	po	[94]XXXIV
			p	[178]
	Pyralidae	*Dichocrocis chlorophanta* Butler	po	[94]
		Herculia glaucinalis L.	mo	[94]
		Herculia pelasgalis Walker	mo	[94]
		Sybrida fasciata Butler	p	[169]
	Saturniidae	*Actias dubernardi* Oberthür	po	[94]
		Actias heterogyna Mell	p	[226]
			po	[94]
		Actias kongjiaria Chu & Wang	p	[226]
		Actias rhodopneuma Röber	po	[226]

Order	Family	Species	H. R.	Ref.
		Actias selene ningpoana Felder	po	[94]XXXV
		Actias sinensis Walker	po	[226]
			po	[94]
			p	[178]
			p	[75]
		Aglia tau amurensis Jordan	po	[226]
		Antheraea pernyi Guerin-Méneville	po	[226]
			po	[94]
			p	[178]
		Antheraea pernyi Guérin-Méneville	p	[166]
		Antheraea yamamai Guerin-Méneville	po	[226]
		Attacus atlas (L.)	po	[226]
		Caligula boisduvalii fallax Jordan	po	[226]
		Caligula lindia bonita Jordan	po	[226]
		Caligula zuleika Hope	po	[226]
		Dictyoploca japonica Moore	po	[226]
		Loepa katinka Westwood	p	[75]
		Rhodinia davidi Oberthür	po	[226]
		Rhodinia fugax Butler	po	[226]
	Sphingidae	*Enpinanga transtriata* Chu & Wang	p	[75]
		Marumba maacki (Bremer)	m	[225]
			p	[227]
		Marumba sperchius Ménétriès	p	[225]
			p	[227]
			p	[166]
		Mimas tiliae christophi (Staudinger)	po	[225]
			po	[227]
		Oxyambulyx liturata (Butler)	p	[225]
			p	[227]
			p	[178]
			p	[75]
		Oxyambulyx ochracea (Butler)	po	[94]
		Oxyambulyx schauffelbergeri (Bremer & Grey)	p	[225]
			p	[166]
			po	[94]
			p	[75]
	Thyrididae	*Rhodoneura erecta* (Leech)	p	[226]
			p	[155]
		Rhodoneura midfascia Chu & Wang	oo	[226]
		Striglina bispota Chu & Wang	po	[226]
		Striglina cancellata Christoph	m	[166]
		Striglina curvita Chu & Wang	po	[226]
		Striglina scitaria Walker	p	[75]
	Tortricidae	*Acleris delicatana* (Christoph)	p	[227]
			po	[78]
		Acleris perfundana Kuznetzov	p	[227]
		Aphelia paleana (Hübner)	p	[227]
		Archips crataegana (Hübner)	p	[227]
		Archips ingentana (Christoph)	p	[227]
		Archips xylosteana (L.)	p	[227]
		Cerace stipatana Walker	po	[94]
		Choristoneura diversana (Hübner)	p	[227]
		Choristoneura longicellana (Walsingham)	p	[227]
			po	[94]
		Croesia conchyloides (Walsingham)	mo	[94]
		Epinotia tenerana (Denis & Schiffermüller)	p	[227]

Order	Family	Species	H. R.	Ref.
		Eudemis porphyrana (Hübner)	p	[227]
		Eulia ministrana (L.)	p	[227]
		Hedya inornata (Walsingham)	p	[227]
		Homona magnanima Diakonoff	p	[178]
			p	[75]
			p	[78]
		Laspeyresia splendana (Hübner)	p	[227]
			po	[94]
		Pandemis cinnamomeana (Treitschke)	p	[227]
			p	[166]
			po	[94]
			p	[75]
		Pandemis corylana (Fabricius)	p	[227]
			po	[94]
		Pandemis heparana (Denis & Schiffermüller)	p	[227]
			po	[94]
		Pandemis ribeana (Hübner)	p	[227]
			po	[94]
		Strophedra nitidana Fabricius	p	[78]
		Syndemis perpulchrana (Kennel)	p	[227]
	Yponomeutidae	*Yponomeuta polystigmellus* Felder & Felder	po	[94]
			po	[78]
	Zygaenidae	*Illiberis sinensis* Walker	po	[94]
Parasitiformes	Phytoseiidae	*Euseius subplebeius* (Wu & Li)	po	[75]
Phasmida	Bacillidae	*Baculum dolichocercatum* Bi & Wang	m	[155]
		Baculum irregulariter-dentatum Brunner von Wattenwyl	p	[155]
	Phasmatidea	*Phobaeticus longicornis* Bi & Wang	m	[155]
		Phraortes elongatus Thunberg	po	[94]
		Phraortes illepidus (Brunner von Wattenwyl)	p	[155]
		Sipyloidea truncata Chen & He	m	[155]
Thysanoptera	Phlaeothripidae	*Neoheegeria* sp.	m	[155]
	Thripidae	*Selenothrips rubrocinctus* (Giard)	po	[66]
			po	[75]

I Recorded as *Clinterocera mandarinus* (Westwood)

II Recorded as *Potosia famelica* Janson

III Recorded as *Potosia lugubris orientalis* Medvedev

IV Recorded as *Potosia nitididorsis* Fairmaire

V Recorded as *Greenidea hangnigri* Zhang

VI Possible synonym of *Andricus ostreus* (Hartig)

VII Recorded as *Zeuzera leuconotus* Butler

VIII Recorded as *Zanclalbara scabiosa* (Butler) as well as *Agnidra scabiosa fixseni* (Bryk)

IX Recorded as *Exurapteryx aristidaria* (Oberthür)

X Recorded as *Parasa consocia* Walker

XI Recorded as *Parata hilarata* (Staudinger)

XII Recorded as *Acronicta leporina leporella* Staudinger

XIII Recorded as *Bena fagana* L.

XIV Recorded as *Daseochaeta pallida* Moore

XV Recorded as *Parallelia stuposa* Fabricius

XVI Recorded as *Catocala dissimilis* Bremer

XVII Recorded as *Chalciope stolida* (Fabricius)

XVIII Recorded as *Sypna astrigera* Butler

XIX Recorded as *Sypna punctosa* Walker

XX Recorded as *Polia contigua* (Schiffermüller et Denis)

XXI Recorded as *Daseochaeta alpium* (Osbeck)

XXII Recorded as *Daseochaeta alpium* (Osbeck), as well as *Trichosea champa* Moore, and *Moma alpium*

(Osbeck)
[xxiii]Recorded as *Bena sylpha* (Butler)
[xxiv]Recorded as *Sypna picta* Butler
[xxv]Recorded as *Sypna simplex* Leech
[xxvi]Recorded as *Xylena exoleta* (L.)
[xxvii]Recorded as *Urodonta viridimixta* (Bremer)
[xxviii]Recorded as *Lampronadata cristata* (Butler)
[xxix]Recorded as *Rabtala cristata* (Butler)
[xxx]Recorded as *Hybocampa umbrosa* (Staudinger)
[xxxi]Recorded as *Phalera albibasis* (Chiang)
[xxxii]Recorded as *Naganoea albibasis* (Chiang), as well as *Phalerodonta albibasis* (Chiang)
[xxxiii]Recorded as *Cryptothelea minuscula* Butler
[xxxiv]Recorded as *Cryptothelea variegata* Snellen
[xxxv]Recorded as *Actias selene* Hübner

Reynoutria japonica
Polygonum cuspidatum
Fallopia japonica
Japanese knotweed

Introduction
The genus *Reynoutria* contains 3 species occurring in eastern Asia. In China, the only reported species occurs in southern Gansu and southern Shaanxi, eastern, southern, southwestern, and central China. The species under this account are also considered as the constituents of the genus *Polygonum L.,* or genus *Fallopia* Adanson.

Species of *Reynoutria* in China
Reynoutria japonica Houtt.

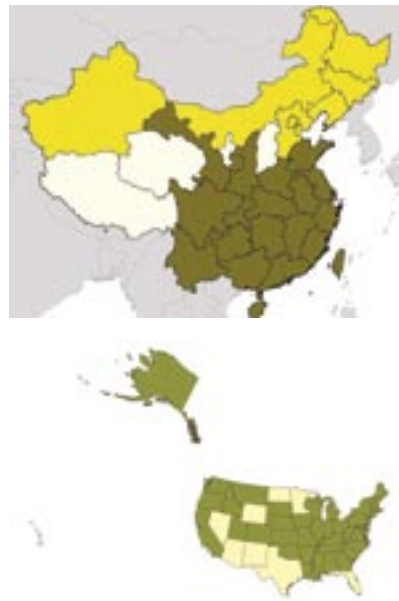
Taxonomy
Order: Polygonales
Family: Polygonaceae
Subfamily: Polygonideae
Tribe: Polygoneae
Genus: *Reynoutria* Houtt.
Species: *Reynoutria japonica* Houtt.*

*also commonly known as *Polygonum cuspidatum* Sieb. & Zucc., and *Fallopia japonica* (Houttuyn) Ronse Decraene

Description
Reynoutria japonica is a stout perennial with long-lived, sturdy creeping rhizomes. The hollow, erect stems, reaching, 1-2 m in height, are glabrous, and have conspicuous vertical furrows, swollen nodes and scattered red or purplish red spots. The nearly leathery leaves are glabrous, broadly ovate or ovoid elliptic, 5-12 cm long and 4-9 cm wide, with acuminate apex, broadly cuneate, truncate or suborbicular base and entire margins. The brownish ochrea, often caducous, is membranous, glabrous, asymmetrical, 3-5 mm in length, truncate apically, and vertically veined. The unisexual flowers are borne on axillary panicles 3-8 cm long. Bracts are funnel-shaped, about 1.5-2 mm long, and acuminate at the apex, each containing 2 to 4 flowers. The stipule is a membranous sheath, 2-4 mm long. The greenish-white flowers appear in August throught September. The shiny blackish brown achenes, contained in a persistent perianth are about 4-5 mm long, are produced in September through October [96]

Habitat
R. japonica occurs in thickets on mountain slopes, valleys, roadsides, and wetlands in field margins, at elevations of 100-2000 meters[96, 100].

Distribution
R. japonica is occurs in Anhui, Fujian, northern Gansu, Guangdong, Guangxi, Guizhou, Hainan, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Shandong, Sichuan, Taiwan, Yunnan, and Zhejiang provinces. It is cultivated in Hebei, Heilongjiang, Liaoning, Jilin, Inner Mongolia, and Xinjiang provinces[17, 22, 52, 100, 104].



Economic Importance
The rhizomes of *Reynoutria japonica* are medicinally useful[96].

Natural Enemies of *Reynoutria*
Two fungi have been found on *R. japonica*. Five arthropods are reported to be associated with *R. japonica*.

Fungi

Phylum	Family	Species	H. R.	Ref
Basidiomycota	Pucciniaceae	*Puccinia polygoni-amphibii* Pers.*	o	[26]
		Puccinia polygoni-amphibii Persoon var. *polugoni-sieboldii* Hiratsuka f. & S. Kaneko	p	[229]
Anamorphic Uredinales		*Aecidium polygoni-cuspidati* Dietel	o	[26]

*Probable synonym of *Puccinia polygoni-amphibii* Persoon var. *polugoni-sieboldii* Hiratsuka f. & S. Kaneko

Arthropods

Order	**Family**	***Species***	**H. R.**	**Ref.**
Lepidoptera	Geometridae	*Ectropis excellens* Butler	p	[189]
	Lycaenidae	*Celastrina argiola* (L.)	p	[219]
		Plebejus argus (L.)	p	[219]
	Noctuidae	*Polia illoba* (Butler)	p	[228]
		Xylena formosa (Butler)	p	[166]

Rhamnus species
Buckthorn

Introduction
The genus *Rhamnus* contains approximately 200 species occurring primarily in temperate to tropical regions of eastern Asia and North America. Fifty eight species and 14 varieties occur nationwide in China. The largest populations occur in southwestern and southern China[3].

I. *Rhamnus cathartica*
Common buckthorn

Taxonomy
Order: Rhamnales
Family: Rhamnaceae
Genus: *Rhamnus* L.
Subgenus: Frangula (Mill.) S. F. Gray
Species: *Rhamnus cathartica* L.

Description
Rhamnus cathartica is a shrub or small tree 5-8 m in height. The branchlets are purplish red or silvery gray, opposite or nearly so along the main stems, with terminal spines. Scales of terminal buds are marginally hairy. Leaves are papery, nearly opposite, alternate, or clustered in the twigs. The leaf blade is elliptic, ovoid elliptic, or ovate, 3-6.5 cm long and 1.5-3 cm wide, with a shortly acuminate, acute or obtuse apex, rounded or broadly cuneate base and densely crenate serrate margin. Both sides of the leaf are glabrous. There are 3-4 pairs of lateral veins, the proximal one of which is stout, and often conspicuously divaricated. The petiole is 1-2.7 cm long, grooved, and pilose or nearly glabrous. The flowers are unisexual, dioecious, 4-merous and usually grow in clusters of 10 on the twigs or from the leaf axil on the lower part of the long branches. The pedicel is 2-4 mm long. Male flowers have petals, but the stamens are degenerate and small. The ovary of female flowers has 3 loculi, with 1 ovule each. The style is long and 3-lobed. Fruits are black globular drupes, with 3 internal pyrenes with persistent calyx-tubes at the base. The fruit's pedicel is 5-8 mm long. The seeds are shortly grooved dorsally, and sutured adaxially. Flowers appear May through June, and fruits July through September[3].

Habitat and Distribution
R. cathartica occurs in valleys and hillside thickets at elevations of 1200-1400 m in northern Xinjiang[3].

Economic Importance
The fruits of *R. cathartica* contain catharine, a laxative substance which used medicinally[3].

II. *Rhamnus frangula*
Glossy buckthorn

Taxonomy
Order: Rhamnales
Family: Rhamnaceae
Genus: *Rhamnus* L.
Subgenus: Rhamnus
Section: Rhamnus
Species: *Rhamnus frangula* L.

Description
Rhamnus frangula is a shrubby or small woody tree up to 7 m in height. The branchlets are purplish brown, sparsely pubescent. the leaves are papery, broady elliptic, oblong, or occasionally obovate, 4-11 cm long and 2.5-6 cm wide, apiculate or round in the apex, broadly cuneate or nearly round at base, with entire margins. The upside of the leaves is dark green, glabrous, while underside is light green, pilose along the midrib, with 6-10 lateral veins. The petiole is about 1-1.9 cm long, and glabrescently pubescent. Growing solitary or in clusters of no less than 2 in the leaf axil, flowers are bisexual, 5-merous, glabrous, with pedicel about

5-10 mm long. Sepals have beak like outgrowth in the apex. Petals are rounded, slightly lobed apically. Floral disc is thin and cup-shaped. Ovary is globose, 2-celled with 1 ovule for each. Fruits are globose drupes that are 6-8 mm in diameter, red at maturity, but turning purplish-black. Fruit pedicels are 7-10 mm long. Flowers appears from April through July, and fruits June through September[3].

Habitat and Distribution

R. frangula occurs in forest margins, along riverbanks and lakesides, in northern Xinjiang province[3].

Economic Importance

The bark of *R. frangula* is also medically useful. The bark and immature fruit are sources of dye. The wood is used to make gunpowder[3].

Related Species

In China, *R. davurica* P. S. Pallas is the most commonly known member of the genus *Rhamnus*. It occurs in the forest on slopes, in thickets or in forest margins, and wet areas near ditches at elevations under 1800 m in Hebei, Heilongjiang, Jilin, Liaoning, and Shanxi provinces[3].

Natural Enemies of *Rhamnus*

Fifteen species of fungi and 20 arthropods

have been recorded for members of the genus *Rhamnus*, but none of them are known to attack *R. cathartica* or *R. frangula*

Species of *Rhamnus* in China

Scientific Names	Scientific Names
R. arguta Maximovicz.	*R. leptacantha* C. K. Schneider
R. aurea Heppler	*R. leptophylla* C. K. Schneider
R. bodinieri H. Leveille	*R. liukiuensis* (Wilson) Koidzumi
R. brachypoda C. Y. Wu ex Y. L. Chen	*R. longipes* Merril et Chun
R. bungeana J. Vassieew.	*R. maximovicziana* J. Vassilev.
R. cathartica Linneus	*R. minuta* Grubav
R. coriophylla Handel-Mazzetti	*R. nakaharai* (Hayata) Hayata
R. crenata S. A. Siebold et Zuccarinii	*R. napalensis* (Wall.) Lawson
R. davurica P. S. Pallas	*R. nigricans* Handcl-Mazzetti
R. diamantiaca T. Nakai	*R. parvifolia* Bung
R. dumetorunn C. K. Schneider	*R. procumbens* Edgeworth
R. erythroxylon Pallas	*R. prostrata* H. A. Jacques
R. esquirolii H. Leveille	*R. rhododendriphylla* Y. L. Chen
R. flavescens Y. L. Chen et P. K. Chou	*R. rosthornii* E. Pritzen

Scientific Names	Scientific Names
R. formossana Matsumura	*R. rugulose* Hemsley
R. frangula Linneaus	*R. sargentiana* Schneider
R. fulvo-tincta Metcalf.	*R. schneideri* H. Leveille. et Vaniot Fedde
R. gilgiana Hepper	*R. songorica* Gontsch
R. globosa Bunge	*R. subapetala* E. D. Merril
R. grandiflora C. Y. Wu ex Y. L. Chen	*R. tangutica* J. Vassilev
R. hainanensis Merril et Chun	*R. tzetweiensis* Y. L. Chen et P. K. ChouBull.
R. hemsleyana C. K. Schneider	*R. ussuriensis* J. Vassilev.
R. henryi C. K. Schneider	*R. utilis* J. Decaisrne
R. heterophylla Oliver	*R. velutina* Anthony
R. hupehensis C. K. Schneider	*R. virgata* Roxburg.
R. iteinophylla C. K. Schneider	*R. wilsonii* C. K. Schneider
R. koraiensis C. K. Schneider	*R. wumingensis* Y. L. Chen et P. K. Chou
R. kwangsiensis Y. L. Chen et P. K. Chou	*R. xizangensis* Y. L. Chen et P. K. Chou
R. lamprophylla C. K. Schneider	

Fungi

Phylum	Family	Species	H. R.	Ref.
Ascomycota	Erysiphaceae	*Erysiphe friesii* (Lév.) U. Braun & S. Takam	mo	[4]I
			po	[6]I
	Meliolaceae	*Microsphaera penicillata* (Wallr.) Lév.	po	[4]II
Basidiomycota	Pucciniaceae	*Puccinia coronata* Corda	po	[14]
			po	[4]
		Puccinia poae-pratensis Miura	po	[4]
Anamorphic *Gibberella*		*Fusisporium bacilligerum* Berk. & Broome	mo	[4]III
Anamorphic *Guignardia*		*Phyllosticta rhamnicola* Desm.	mo	[4]
Anamorphic Leptosphaeria		*Coniothyrium dumeei* Briosi & Cavara	mo	[4]
		Coniothyrium rhamni Miyake	oo	[4]
Anamorphic *Mycosphaerella*		*Cercospora rhamni* Fuckel	mo	[4]
			mo	[5]IV
		Pseudocercospora bacilligera (Berk. & Broome) Y.L. Guo & X.J. Liu	oo	[11]
		Pseudocercospora rhamnaceicola Goh & W.H. Hsieh	po	[11]
		Septoria frangulae Guépin	mo	[4]
		Septoria rhamni-catharticae Ces.	mo	[1]
Anamorphic Mycosphaerellaceae		*Ascochyta rhamni* W.B. Cooke & C.G. Shaw	mo	[4]
Anamorphic Uredinales		*Aecidium alaterni* Maire	oo	[4]

[I]Recorded as *Microsphaera friesii* Lév.
[II]Recorded as *Microsphaera alni* (Wallr.) Salm.
[III]Recorded as *Cercospora bacilligera* (Berk. & Broome) Wollenw.
[IV]Regarded as *Passalora rhamni* (Fuckel) U. Braun

Arthropods

Order	Family	Species	H. R.	Ref
Homoptera	Aphididae	*Aphis glycines* (Matsumura)	po	[17]
		Aphis gossypii Glover	po	[17]
		Aphis rhamni Boyer de Fonscolombe	mo	[10]
		Aphis utilis Zhang	mo	[17]
	Psyllidae	*Cacopsylla rhamnae* Li & Sun	mo	[12]
	Triozidae	*Eubactericera curvata* Li & Sun	mo	[9]
Lepidoptera	Geometridae	*Acasis viretata* (Hübner)	po	[16]
			po	[13]I
		Ophthalmodes irrorataria Bremer & Grey	po	[15]
		Philereme transversata Hüfnagel	mo	[16]
			oo	[13]
	Lycaenidae	*Megisba malaya sikkima* Moore	po	[18]
		Rapala caerulea (Bremer & Grey)	po	[18]
		Satyrium iyonis (Oxta & Kusunoki)	po	[18]
			po	[18]
		Satyrium spini (Denis & Schiffermüller)	oo	[18]
	Lymantriidae	*Teia ericae* Germar	po	[7]II
	Noctuidae	*Cymatophoropsis trimaculata* (Bremer)	mo	[2]
			po	[7]
	Pieridae	*Eurema hecabe hobsoni* (Butler)	po	[18]
		Gonepteryx amintha Blanchard	mo	[18]
		Gonepteryx amintha formosana Fruhstorfer	po	[18]
			po	[18]
		Gonepteryx rhamni (L.)	po	[18]
	Thyrididae	*Rhodoneura lobulatus* (Moore)	mo	[19]

[I]Recorded as *Ophthalmitis irrorataria* (Bremer & Grey)
[II]Recorded as *Orgyia ericae* Gremer

Rosa multiflora
Multiflora rose

Introduction
There are 200 members of the genus *Rosa* distributed widely in subtropical to cold temperate regions of Asia, Europe, North Africa and North America. In China, 95 species have been recorded[60].

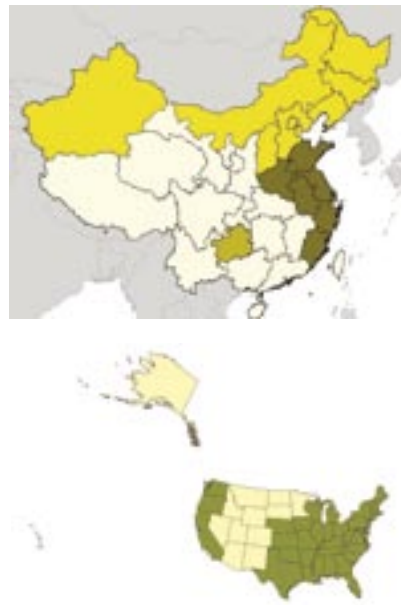
Taxonomy
Order: Rosales
Suborder: Rosineae
Family: Rosaceae
Subfamily: Rosoideae Focke
Genus: *Rosa* L.
Subgenus: Rosa
Section: Synthylae DC.
Series: Multiflorae Yü et Ku
Species: *Rosa multiflora* Thunb.

Description
Rosa multiflora is a climbing, perennial shrub. The branchlets are glabrous and cylindrical with short curved prickles. The leaf axil, petiole and pedicel are glabrous or covered with glandular hairs. The leaves are imparipinnate, alternate, and composed of 3-9 sharp-toothed leaflets, 5-10 cm long including leafstalk. The leaflets are obovate, oblong or ovate, 1.5-5 cm in length and 0.8-2.8 cm in width, acute or obtuse apex, suborbicular or cuneate base, with simple serrate or biserrate margins. A pair of stipules are adnate to the base of the leafstalk. The upper leaf surface is glabrous and the underside is pubescent. Flowers appear from May through June, as clusters in a corymb inflorescence, 1.5-2 cm in diameter. Each has white, broad-obovate petals that are glabrous outside and pubescent inside. The lanceolate calyx has a retuse apex and a cuneate base. Fruits are red, glabrous, subglobular hips, with a diameter of 6-8 mm, developing from July to August[59].

Habitat
R. multiflora habitats include thickets, forest margins, and along road sides and streams in mountainous areas[9, 88].

Distribution
R. multiflora occurs in northern Anhui, Fujian, Henan, Jiangsu, Shandong, Zhejiang, and possibly Guizhou[36, 40, 59, 60, 88, 109, 175].

Economic Importance
The flowers of *R. multiflora* contain an essential oil used in the food and cosmetic industries. Flowers, fruits, leaves and roots are medically useful. *R. multiflora* is also cultivated as a hedge plant[9].



Related Species
Three varieties of *R. multiflora* are commonly cultivated in China:
1) *R. multflora* var. *cathayensis* Rehd. et Wils., with simple pink flowers, occurs on hilly slopes, scrub or on riverbanks at elevations up to 1300 m. It occurs in Anhui, Fujian, Gansu, Guangdong, Hebei, Henan, Hubei, Jiangxi, Shaanxi, Shandong and Zhejiang provinces. It is planted in northern China as a hedge. The roots contain 25% tannin which is useful in tanning.
2) *R. multiflora* var. *carnea* Thory, with double pink petals, is planted as an ornamental and as a hedge.
3) *R. multiflora* var. *alboplena* Yu et Ku, with double, white petals, is

commonly cultivated in Beijing as an ornamental[59].

Forty-eight species of fungi and 95 arthropods have been found on the members of the genus *Rosa.*

Natural Enemies of Rosa

Species of *Rosa* in China

Scientific Name	Scientific Name
R. ×*alba* L.†	*R. longicuspis* Bertol.
R. ×*fortuneana* Lindley†	*R. luciae* Fr. & Rochebr.‡
R. acicularis Lindl.	*R. lucidissima* Lévl.
R. albertii Regel	*R. ludingensis* T. C. Ku‡
R. anemoniflora Fort. ex Lindl.	*R. macrophylla* Lindl.
R. baiyushanensis Q. L. Wang‡	*R. mairei* Lévl.
R. banksiae Ait.	*R. maximowicziana* Regel.
R. banksiopsis Baker	*R. miyiensis* T. C. Ku‡
R. beggeriana Schrenk	*R. morrisonensis* Hayata
R. bella Rehd. et Wils.	*R. moyesii* Hemsl. et Wils.
R. berberifolia Pall.	*R. multibracteata* Hemsl. et Wils.
R. bracteata Wendl.	***R. multiflora* Thunb.**
R. brunonii Lindl.	*R. murielae* Rehd. et Wils.
R. calyptopoda Card.	*R. odorata* (Andr.) Sweet
R. caudata Baker	*R. omeiensis* Rolfe
R. centifolia L.†	*R. oxyacantha* M. Bieb.
R. chengkouensis Yü et Ku	*R. persetosa* Rolfe
R. chinensis Jacq.	*R. pinnatisepala* T. C. Ku‡
R. corymbulosa Rolfe	*R. platyacantha* Schrenk
R. cymosa Tratt.	*R. praelucens* Byhouwer
R. daishanensis T. C. Ku‡	*R. prattii* Hernsl.
R. damascena Mill.†	*R. pricei* Hayata‡
R. davidii Crép.	*R. primula* Bouleng.
R. davurica Pall.	*R. pseudobanksiae* Yü et Ku
R. deqenensis T. C. Ku‡	*R. roxburghii* Tratt.
R. derongensis T. C. Ku‡	*R. rubus* Lévl. et Vant.
R. duplicata Yü et Ku	*R. rugosa* Thunb.
R. fargesiana Boulenger‡	*R. sambucina* Koidzumi var. *pubescens* Koidzumi‡
R. farreri Stapf ex Cox.	*R. saturata* Baker
R. fedtschenkoana Regel	*R. sericea* Lindl.
R. filipes Rehd. et Wils.	*R. sertata* Rolfe
R. foetida Herrm. var. *persiana* (Lem.) Rehd.	*R. setipoda* Hemsl. et Wils.
R. forrestiana Bouleng.	*R. shangchengensis* T. C. Ku‡
R. gallica L.†	*R. sikangensis* Yü et Ku
R. giraldii Crép.	*R. sinobiflora* T. C. Ku‡
R. glomerata Rehd. et Wils.	*R. soulieana* Crép.
R. graciliflora Rehd. et Wils.	*R. spinosissima* L.
R. helenae Rehd. et Wils.	*R. sweginzowii* Koehne
R. henryi Bouleng.	*R. taiwanensis* Nakai‡
R. hezhangensis T. L. Xu‡	*R. taronensis* Yü et Ku
R. hugonis Hemsl.	*R. Tibetica* Yü et Ku

Scientific Name	Scientific Name
R. kokanica Regel ex Juzep.	*R. transmorrisonensis* Hayata
R. koreana Kom.	*R. tsinglingensis* Pax. et Hoffm.
R. kunmingensis T. C. Ku‡	*R. uniflorella* Buzunova*
R. kwangtungensis Yü et Tsai	*R. webbiana* Wall. ex Royle
R. kweichowensis Yü et Ku	*R. weisiensis* Yü et Ku
R. laevigata Michk.	*R. wichuraiana* Crép.†
R. langyashanica D. C. Zhang et J. Z. Shao‡	*R. willmottiae* Hemel.
R. lasiosepala Metc.	*R. xanthina* Lindl.
R. laxa Retz.	*R. zhongdianensis* T. C. Ku‡
R. lichiangensis Yü et Ku	

†Cultivated
‡not listed in *FRPS*[59]
*Recorded as *R. uniflora* Yü et Ku in *FRPS5*[59]

Fungi

Phylum	Family	Species	H. R.	Ref.
Ascomycota	Botryosphaeriaceae	*Guignardia rosae* (Auersw.) Petr.	mo	[26]
	Capnodiaceae	*Caldariomyces fumago* Woron.	p	[26]I
	Dermateaceae	*Diplocarpon rosae* F.A. Wolf	mo	[26]II
	Elsinoaceae	*Elsinoë rosarum* Jenkins & Bitanc.	oo	[26]III
	Erysiphaceae	*Medusosphaera rosae* Golovin & Gamalizk.	oo	[24]
			mo	[26]
		Sphaerotheca fuliginea (Schltdl.) Pollacci	po	[26]
		Sphaerotheca humuli (DC.) Burrill	po	[26]
		Sphaerotheca pannosa (Wallr.) Lév.	po	[24]
			po	[26]IV
		Sphaerotheca rosae (Jacz.) Z.Y. Zhao	oo	[24]
		Uncinula simulans E.S. Salmon	oo	[26]
		Uncinuliella simulans var. *rosae-rubi* R.Y. Zheng & G.Q. Chen	oo	[24]
	Incertae sedis	*Hendersonia sarmentorum* Westend.	mo	[26]
	Meliolaceae	*Appendiculella calostroma* (Desm.) Höhn.	po	[72]
		Asteridiella rosae (Hansf.) Hansf.	po	[72]
		Irenina rosae Hansf.	mo	[26]
	Mycosphaerellaceae	*Mycosphaerella rosigena* (Ellis & Everh.) Lindau ex McMurran	oo	[26]
		Sphaerulina rehmiana Jaap	po	[26]V
			p	[1]VI
	Rhytismataceae	*Colpoma rosae* (Teng) Teng	oo	[26]
	Valsaceae	*Valsa ceratosperma* (Tode) Maire	po	[26]VII
Basidiomycota	Phragmidiaceae	*Gerwasia rosae* F.L. Tai	o	[26]
		Kuehneola japonica Diet.	o	[26]
		Phragmidium handelii Petr.	mo	[26]
		Phragmidium hashiokai Hirats. f.	mo	[26]
		Phragmidium montivagum Arthur	oo	[26]
		Phragmidium mucronatum (Pers.) Schltdl.	o	[26]
		Phragmidium rosae-davuricae Miura	oo	[26]

Phylum	Family	Species	H. R.	Ref.
		Phragmidium rosae-multiflorae Dietel	o	[26]
		Phragmidium rosae-rugosae Kasai	oo	[26]
		Phragmidium tuberculatum Jul. Müll.	oo	[26]
		Teloconia kamtschatkae (H.W. Anderson) Hirats. f.	oo	[26]
Anamorphic Ascomycetes		*Monochaetia concentrica* (Berk. & Broome) Sacc. & D. Sacc.	mo	[26]
		Monochaetia seiridioides (Sacc.) Sacc. & D. Sacc.	oo	[26]
		Myxosporium rosae Fuckelel	oo	[26]
Anamorphic *Botryotinia*		*Botrytis cinerea* Pers.	po	[26]
Anamorphic *Lewia*		*Alternaria alternata* (Fr.) Keissl.	po	[209]
		Alternaria rosicola (V.G. Rao) T.Y. Zhang & Y.L. Guo	mo	[209]
		Alternaria tamijiana Rajd.	mo	[209]
		Alternaria tenuissima (Kunze) Wiltshire	po	[209]
Anamorphic *Mycosphaerella*		*Cercospora puderii* B.H. Davis	o	[26]
		Cercospora rosae (Fuckelel) Höhn.	o	[26]
		Cercospora rosicola Pass.	o	[26]
			oo	[65]VIII
		Cladosporium cladosporioides (Fresen.) G.A. de Vries	po	[210]
		Cladosporium oxysporum Berk. & M.A. Curtis	po	[210]
		Cladosporium tenuissimum Cooke	po	[210]
		Pseudocercospora puderi B.H. Davis ex Deighton	oo	[129]
Anamorphic Mycosphaerellaceae		*Ascochyta rosicola* Sacc.	mo	[1]
Anamorphic *Pseudovalsa*		*Coryneum rosicola* Miura	oo	[26]
Anamorphic Uredinales		*Caeoma warburgianum* Henn.	oo	[26]IX

[I]Recorded as *Fumago vagans* Pers
[II]Recorded as *Actinonema rosae* (Lib.) Fr.
[III]Recorded as *Phyllosticta rosarum* Pass.
[IV]Recorded as *Oidium leucoconium* Desm.
[V]Recorded as *Septoria rosae* Desm.
[VI]Recorded as *Septoria rosae* (Libert) Desm.
[VII]Recorded as *Valsa coronata* (Hoffm.) Fr.
[VIII]Recorded as *Passalora rosicola* (Pass.) U. Braun
[IX]Possibly the synonym of *Caeoma warburgiana* Henn.

Arthropods

Order	**Family**	**Species**	**H. R.**	**Ref.**
Acariformes	Eriophyidae	*Panonychus citri* (McGregor)	p	[166]
		Phyllocoptes rosarum (Liro)	mo	[90]
	Tetranychidae	*Eotetranychus kankitus* Ehara	p	[166]
			p	[166]
		Eotetranychus smithi Pritchard & Baker	po	[167]
		Oligonychus biharensis (Hirst)	po	[167]
		Pananychus ulmi (Koch)	po	[167]

Order	Family	Species	H. R.	Ref.
Coleoptera	Attelabidae	*Apoderus praecellens* Sharp	mo	[75]
	Cerambycidae	*Molorchus liui* Gressitt	mo	[86]
	Chrysomelidae	*Luperomorpha Xanthodera* Fairmaire	p	[201]
		Nonarthra postfasciata (Fairmaire)	m	[165]
		Nonarthra variabilis Baly	m	[165]
		Tuomueria tibialis Chen et Jiang	oo	[201]
	Crioceridae	*Lilioceris egena* (Weise)	po	[75]
		Temnaspis pulchra Baly	oo	[164]
	Eumolpidae	*Cleoporus variabilis* (Baly)	po	[165]
			po	[164]
Hemiptera	Acanthosomatidae	*Platacantha forfex* (Dallas)	po	[208]
		Sastragala edessoides Distant	po	[208]
Homoptera	Aphididae	*Acyrthosiphon dirhodum* (Walker)	po	[165]
		Longicaudus trirhodus (Walker)	po	[113]
			po	[205]
		Macrosiphum rosae L.	oo	[178]
		Macrosiphum rosivorum Zhang	oo	[205]
			oo	[75]
		Matsumuraja formosana Takahashi	oo	[75]
		Myzaphis rosarum (Kaltenbach)	oo	[165]
		Rhodobium porosum (Sanderson)	po	[113]
	Asterolecaniidae	*Russellaspis pustulans* (Cockerell)	po	[173]
	Cerococcidae	*Asterococcus yunnanensis* Borchsenius	po	[173]
	Cicadellidae	*Aguriahana triangularis* (Matsumura)	po	[178]
		Erythroneura sudra (Distant)	po	[57]
		Eutettix disciguttus (Walker)	po	[57]
		Tettigoniella albomarginata (Signoret)	po	[57]
		Typhlocyba rosae (Linnaues)	po	[57]
	Coccidae	*Ceroplastes rubens* Maskell	po	[75]
		Coccus hesperidum (L.)	po	[75]
		Metaceronema japonica (Maskell)	po	[173]
			po	[75]
		Pulvinaria vitis (L.)	po	[173]
		Saissetia oleae (Bernard)	po	[173]
	Diaspididae	*Aonidiella citrina* (Coquillett)	po	[165]
			po	[75]
		Chrysomphalus aonidum (L.)	po	[75]
		Pseudaonidia duplex (Cockerell)	po	[165]
			po	[75]
	Margarodidae	*Icerya purchasi* Maskell	po	[165]
			po	[165]
	Pseudococcidae	*Phenacoccus prunicola*. Borchsenius	mo	[172]

Order	Family	Species	H. R.	Ref.
	Ricaniidae	*Ricania speculum* (Walker)	po	[220]
Hymenoptera	Argidae	*Arge pagana* (Panzer)	mo	[75]
Lepidoptera	Geometridae	*Cidaria fulvata* (Forster)	mo	[195]
			o	[25]
		Hypomecis punctinalis conferenda (Butler)	po	[178]
			po	[75]
			po	[78]
		Ourapteryx sambucaria L.	po	[161]
		Plemyria rubiginata (Denis et Schiffermüller)	po	[195]
		Sauris hirudinata (Guenée)	po	[195]
		Xanthorhoe saturata (Guenée)	po	[195]
	Limacodidae	*Scopelodes venosa kwangtungensis* Hering	po	[75]
			po	[78]
	Lycaenidae	*Acytolepis puspa* (Horsfield)	p	[219]
		Rapala caerulea (Bremer et Grey)	p	[178]
			p	[219]
		Rapala nissa (Kollar)	po	[219]
	Lymantriidae	*Dasychira horsfieldi* Saunders	po	[213]
		Dasychira pudibunda (L.)	po	[212]
		Euproctis chrysorrhoea (L.)	po	[212]
		Euproctis diploxutha Collenette	po	[75]
			po	[75]
		Euproctis flava (Bremer)	po	[178]
			po	[212]
		Euproctis fraterna (Moore)	po	[166]
			po	[178]
			po	[75]
		Euproctis niphonis (Butler)	po	[75]
		Porthesia similis (Fueszly)	po	[178]
			po	[212]
			po	[75]
		Teia ericae Germar	po	[212]I
			po	[213]
		Teia gonostigma (L.)	po	[212]
			po	[213]
			po	[75]
	Noctuidae	*Acronicta psi* (L.)	po	[25]
		Dysgonia arctotaenia (Guenée)	mo	[166]II
			mo	[224]II
			mo	[75]II
	Notodontidae	*Stauropus alternus* Walker	po	[4]

Order	Family	Species	H. R.	Ref.
	Psychidae	*Clania minuscula* Butler	po	[78]
		Clania variegata Snellen	po	[166]III
		Dappula tertia Templeton	po	[75]
	Saturniidae	*Eriogyna pyretorum* (Westwood)	p	[226]
		Eudia pavonia L.	po	[226]
	Tortricidae	*Acleris cristana* (Denis & Schiffermüller)	po	[133]
			po	[78]
		Adoxophyes cyrtosema Meyrick	po	[78]
		Adoxophyes orana Fischer von Röslerstamm	po	[133]
			po	[75]
		Ancylis comptana (Frölich)	po	[133]
		Celyphoides cespitana (Hübner)	p	[133]IV
		Choristoneura luticostana (Christoph)	po	[133]
		Clepsis rurinana (L.)	po	[133]V
			po	[75]
		Epiblema (Notocelia) tetragonana (Stephens)	po	[133]
		Epiblema rosaecolana (Doubleday)	oo	[133]
		Eulia ministrana (L.)	po	[133]
		Hedya ochroleucana (Frölich)	oo	[133]
		Homona magnanima Diakonoff	po	[75]
			po	[78]
Thysanoptera	Aeolothripidae	*Aeolothrips fasciatus* (L.)	po	[66]
	Phlaeothripidae	*Haplothrips chinensis* Priesner	po	[66]
			po	[75]
		Haplothrips subtilissimus Haliday	po	[66]
	Thripidae	*Ernothrips lobatus* (Bhatti)	po	[66]
		Frankliniella intonsa (Trybom)	po	[66]
		Megalurothrips distalis (Karny)	po	[66]
		Thrips flavidulus Bagnall	po	[66]
			po	[75]
		Thrips flavus Schrank	po	[66]
			po	[75]
		Thrips hawaiiensis (Morgan)	po	[66]
		Thrips palmi Karny	po	[75]
		Thrips tabaci Lindemann	po	[66]
		Thrips vulgatissimus Haliday	p	[165]
			p	[66]

[I]Recorded as *Orgyia ericae* Germar
[II]Recorded as *Parallelia arctotaenia* (Guenée)
[III]Recorded as *Eumeta variegata* Snellen
[IV]Recorded as *Celyphoides cespitanus* (Hübner)
[V]Recorded as *Clepsis (Siclobola) semialbana* (Guenée)

Rottboellia exaltata

Itchgrass, Raoulgrass

Introduction

The genus *Rottboellia* contains four species widespread in tropical and subtropical regions of the Old World and introduced to tropical regions of the New World. Two species occur in China[159].

Species of *Rottboellia* in China

Scientific Name
R. exaltata L. f.
R. laevispica Keng

Taxonomy

Order: Graminales
Suborder: Gramineae
Family: Gramineae (Poaceae)
Subfamily: Panicoideae A. Br.
Tribe: Andropogoneae Dumort.
Subtribe: Rottboelliinae Presl
Genus: *Rottboellia* L. f.
Species: *Rottboellia exaltata* L. f.

Description

Rottboellia exaltata is a robust annual grass with numerous fibrous roots. Sometimes aerial prop roots are also present. Usually erect, appearing in dwarf clusters, the glabrous culm grows up to 2 m in height and 8 mm in diameter. The leaf has a hirsute or glabrescent sheath and a ciliated ligule that is about 2 mm long. The leaf blade is linear, 50 cm long and 2 cm wide, glabrous or hispidulous adaxially, with a prominent midrib. The raceme is

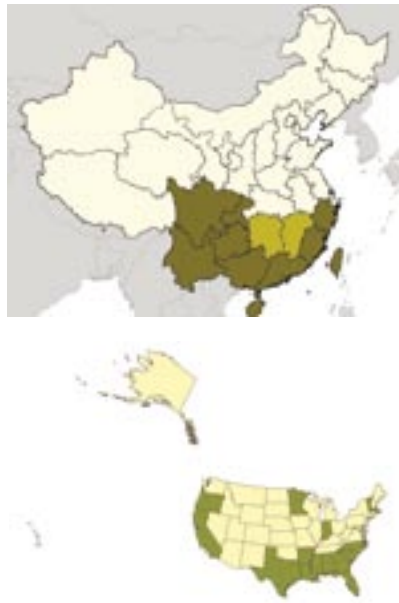
upright, acuminate apically, and can reach a height of 15 cm and diameter of 3-4 mm. The internodes of the inflorescence, are 5 mm long, protrude outward and may be broken off at the node. In the axil are sessile spikelets, with a relatively thin, scaphoid upper glume and a thick, ovate, multi-veined lower glume, with an obtuse, bicuspid or tricuspid apex. The first flower from the bottom is male. Its anther is shorter and darker than that of the second flower from the bottom. The second flower is bisexual with yellow anthers about 2 mm long and purple stigma. The fruit is an ovoid-oblong caryopsis. The stalked spikelet is green, ovoid-oblong with two male florets that are sometimes degenerated. The flowers and fruits appear in autumn[159].

Habitat

R. exaltata occurs in crop fields and along roadsides[159].

Distribution

R. exaltata occurs in the provinces of Fujian, Guangdong, Guangxi, Guizhou, Hainan, Sichuan, Taiwan, Yunnan, Zhejiang[8, 115, 159], and possibly Hunan



and Jiangxi[92, 151].

Economic Importance

R. exaltata is a troublesome weed that thrives in crop fields. It consumes large amounts of water and soil nutrients due to its large size[108, 159].

Related Species

R. laevispica Keng, occurs in shady areas of forests and hilly slopes,. It can be distinguished from *R. exaltata* by its lanceolate, abaxilly sessile, smooth spikelets[159].

Natural Enemies of Rottboellia

Two species of fungi have been found on members of genus *Rottboellia.* There are no records of arthropods associated with *R. exaltata*.

Fungi

Phylum	Family	Species	H. R.	Ref.
Basidiomycota	Pucciniaceae	*Puccinia microspora* Dietel	p	[170]
	Ustilaginaceae	*Sporisorium ophiuri* (Henn.) Vánky	m	[64]
			p	[26]*

*Recorded as *Sphacelotheca ophiuri* (P. Henn.) Ling

Rubus Species
Raspberry

Introduction
The genus *Rubus* contains about 700 species worldwide, primarily in the temperate regions of the Northern hemisphere. Approximately 208 species have been recorded from China[138].

I. Rubus ellipticus var. obcordatus
Yellow Himalayan raspberry

Taxonomy
Order: Rosales
Suborder: Rosineae
Family: Rosaceae
Subfamily: Rosoideae Focke
Genus: *Rubus* L.
Section: Idaeobatus Focke.
Subsection: Stimulantes Yü et Lu
Species: *Rubus ellipticus* Smith
Subspeceis: *Rubus ellipticus* Smith var. *obcordatus* (Franch.) Focke

Description
Rubus ellipticus var. *obcordatus* is a deciduous shrub approximately 1-2 m tall. The branchlets are stout, purplish brown, pubescent, intermixed with prickles and brownish bristles. The leaves are trifoliate. The leaflets are obcordate or obovate, 2-5.5 cm long and 1.5-5 cm wide (terminal leaflet is larger in size), truncate, or subrounded in the apex that is usually lobed, and broadly cuneate at the base, with a serrulate margin. The underside of the leaflet is densely tomentose, dark greenish, with prominent veins. Petiolule and petiole (leaf rachis) are also tomentose, scattered with prickles and bristles. The inflorescence is a dense cyme. The pedicel is short and hairy. Flowers are white or pink, 1-1.5 cm in diameter. The sepals are ovate and densely tomentose on the outer surface. Fruits are yellow globose aggregate fruits 7-9 mm in diameter[85].

Habitat
R. ellipticus var. *obcordatus* occurs on hillside slopes, roadsides or in thickets, valleys, sparse forests, and broad-leaf forests at elevations of 300-2000 m, 700-1800 m in Guizhou, and 1800-2100 m in southeastern Tibet[109, 137, 185].

Distribution
R. ellipticus var. *obcordatus* is distributed in Guangxi, Guizhou, Sichuan, Tibet, and Yunnan provinces[138].

Economic Importance
The twigs and leaves are used medicinally[137]. The fruits are edible.

II. Rubus nivens
Hill raspberry

Taxonomy
Order: Rosales
Suborder: Rosineae
Family: Rosaceae
Subfamily: Rosoideae Focke
Genus: *Rubus* L.
Section: Idaeobatus Focke.
Subsection: Idaeanthi (Foche) Yü et Lu

Species: *Rubus niveus* Thunb.

Description

R. niveus is a shrub 1-2.5 m in height. Branches are purplish red, and farinose, with sparse prickles. Branchlets are purplish or green, and glabrescently tomentose. The leaf typically consists of 7-9 (occasionally 5 or 11) leaflets that are glabrous or pubescent along the leaf vein on the upper surface, and grayish tomentose on the underside, elliptic, ovoid so, or rhombic-elliptic, 2.5-6(8) cm long and 1-3(4) cm wide, acute or obtuse apically, cuneate or rounded basally, with an irregular acutely serrate or rarely obtuse margin. The petiole is about 1.5-4 cm in length. Terminal leaflets are ovate or elliptic, slightly longer than lateral ones, acuminate apically and 3-lobed marginally with a petiole about 0.5-1.5 cm in length. Lateral leaflets are nearly sessile, tomentose with scattered prickles. Stipule is linear lanceolate, and pubescent. The inflorescence is a terminal or axillary corymb or panicle. Pedicels are 0.5-1 cm long and tomentose. Flowers are 1 cm in diameter. Bracts are lanceolate or linear, and pubescent. Calyxes are densely tomentose outside, or mixed with soft hairs, and have triangular ovate or triangular lanceolate sepals that are acute or tapering in the apex and erect when flowering and fruiting. Shorter than the sepals, the petals are red, nearly orbicular, and bear short claws at the base. Fruits are semiglobose, 8-12 mm in diameter, dark red becoming black, densely white tomentose. Pyrenes are slightly rugose. Flowers appear from May through July, and fruit from August through September[137].

Habitat

R. niveus occurs in thickets along hillside slopes, in sparse forests, valleys, flood land, and along streamsides at elevations of 500-2800 m[138], 500-2100 m in Guizhou, 1900-2800 m in Tibet, and 700-2600 m in Tsingling Mountains[79, 109, 185].

Distribution

R. niveus is reported to occur in Gansu, Guangxi, Guizhou, Henan, Shaanxi, Sichuan, Taiwan, Tibet, and Yunnan provinces[28, 138].

Economic Importance

Fruits are edible and useful in wine-making. The roots contain an extract used in tanning[137].

III. Rubus phoenicolasius
Wine raspberry

Taxonomy

Order: Rosales
Suborder: Rosineae
Family: Rosaceae
Subfamily: Rosoideae Focke
Genus: *Rubus* L.
Section: Idaeobatus Focke.
Subsection: Stimulantes Yü et Lu
Species: *Rubus phoenicolasius* Maxim.

Description

Rubus phoenicolasius is a shrub approximately 1-3 m high covered with densely reddish brown glandular hairs and sparse prickles. The branches are erect initially, but will root where they come in contact with soil. The leaves are composed of 3 (rarely 5) ovate, broadly ovate, rhombic, or occasionally elliptic leaflets, 4-8 cm long and 2-5 cm wide, with an acute to acuminate apex, rounded or subcordate base, and irregularly serrate,

usually incised leaf margin. Petiole is 3-6 cm long. The terminal leaflets are slightly lobed, and petiolule 2-3 cm long, whereas the lateral leaflet is subsessile. Stipule is linear, pubescent and glandular hairy. The inflorescence is a terminal or axillary raceme. The flowers are few in number, 6-10 mm in diameter, with a long pedicel about 5-15 mm long and lanceolate bracts. The sepals are lanceolate, caudate in the apex, and about 1-1.5 cm in length. Petals are erect, purplish red, obovate spatulate, or nearly orbicular, with claws and soft hairs near the base. Fruits are red, glabrous, semiglobose, aggregate drupelets, 1 cm in diameter. Pyrenes have rugose wrinkles and pits. Flowers appear in May through June, and fruit July through August[137].

Habitat

R. phoenicolasius occurs along roadsides, in valleys, and forests, at low to medium elevations[138]. *R. phoenicolasius* may occur as an understory plant at elevations of 700-2000 m in the Tsingling mountain area[79], 3300m in Qinghai[127], and 1400 m in Shanxi; thickets along hillsides and moist valleys in Henan[28]; thickets at forest edges in the Helanshan mountain area of Ningxia[141], and at elevations of about 600 m in northwestern Hubei[55].

Distribution

R. phoenicolasius occurs in Gansu, Henan, Hubei, Hunan, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, and Sichuan provinces[138, 141, 151].

Economic Importance

The stems and leaves are used medicinally and the fruits are edible. The stems can be used in making tanning extracts[137].

Natural Enemies of *Rubus*

In China, 42 fungi and 43 arthropods have been recorded as associated with members of the genus *Rubus*. Two fungi, *Hamaspora sinica* F.L. Tai & C.C. Cheo and *Phragmidium nambuanum* Dietel, are recorded as associates of *R. phoenicolasius*. *Hamaspora rubi-sieboldii* (Kawagoe) Dietel, is associated with *R. ellipticus* var. *obcordatus*, which is also host to two arthropod species, *Photoscotosia miniosata* (Walker) and *Chlamisus setosus* (Bowditch).

Species of *Rubus* in China

Scientific Name	Scientific Name
R. acuminatus Smith	*R. lobatus* T. T. Yu et L. T. Lu
R. adenophorus Rolfe	*R. lobophyllus* Y. K. Shih ex F. P. Metcalf,
R. alceifolius Poiret	*R. lohfauensis* F. P. Metcalf
R. alexeterius Focke	*R. lucens* Focke
R. alnifoliolatus H. Léveillé	*R. luchunensis* T. T. Yu et L. T. Lu
R. amabilis Focke	*R. lutescens* Franchet
R. amphidasys Focke	*R. macilentus* Cambessèdes
R. angustibracteatus T. T. Yu et L. T. Lu	*R. malifolius* Focke
R. arachnoideus Y. C. Liu et F. Y. Lu	*R. malipoensis* T. T. Yu et L. T. Lu
R. arcticus L.	*R. mallotifolius* C. Y. Wu ex T. T. Yu et L. T. Lu
R. assamensis Focke	*R. menglaensis* T. T. Yu et L. T. Lu

Scientific Name	Scientific Name
R. aurantiacus Focke	*R. mesogaeus* Focke
R. austroTibetanus T. T. Yu et L. T. Lu	*R. metoensis* T. T. Yu et L. T. Lu
R. bambusarum Focke	*R. multisetosus* T. T. Yu et L. T. Lu
R. biflorus Buchanan-Hamilton ex Smith	*R. nagasawanus* Koidzumi
R. bonatianus Focke	*R. neoviburnifolius* L. T. Lu et Boufford
R. brevipetiolatus T. T. Yu et L. T. Lu	***R. niveus* Thunberg**
R. buergeri Miquel	*R. nyalamensis* T. T. Yu et L. T. Lu
R. caesius L.	*R. oblongus* T. T. Yu et L. T. Lu
R. calycacanthus H. Léveillé	*R. ourosepalus* Cardot
R. calycinus Wallich ex D. Don	*R. pacificus* Hance
R. caudifolius Wuzhi	*R. panduratus* Handel-Mazzetti
R. chamaemorus L.	*R. paniculatus* Smith
R. chiliadenus Focke	*R. pararosifolius* F. P. Metcalf
R. chingii H. H. Hu	*R. parkeri* Hance
R. chroosepalus Focke	*R. parviaraliifolius* Hayata
R. chrysobotrys Handel-Mazzetti	*R. parvifolius* L.
R. cinclidodictyus Cardot	*R. paucidentatus* T. T. Yu et L. T. Lu
R. clivicola E. Walker	*R. pectinarioides* H. Hara
R. cochinchinensis Trattinnick	*R. pectinaris* Focke
R. cockburnianus Hemsley	*R. pectinellus* Maximowicz
R. columellaris Tutcher	*R. pedunculosus* D. Don
R. corchorifolius L.	*R. peltatus* Maximowicz
R. coreanus Miquel	*R. penduliflorus* C. Y. Wu ex T. T. Yu et L. T. Lu
R. crassifolius T. T. Yu et L. T. Lu	*R. pentagonus* Wallich ex Focke
R. crataegifolius Bunge	***R. phoenicolasius* Maximowicz**
R. croceacanthus H. Léveillé	*R. pileatus* Focke
R. delavayi Franchet	*R. piluliferus* Focke
R. dolichophyllus Handel-Mazzetti	*R. pinnatisepalus* Hemsley
R. doyonensis Handel-Mazzetti	*R. pirifolius* Smith
R. dunnii F. P. Metcalf	*R. platysepalus* Handel-Mazzetti
***R. ellipticus* Smith**	*R. playfairianus* Hemsley ex Focke
R. erythrocarpus T. T. Yu et L. T. Lu	*R. pluribracteatus* L. T. Lu et Boufford
R. eucalyptus Focke	*R. poliophyllus* Kuntze
R. eustephanos Focke	*R. polyodontus* Handel-Mazzetti
R. faberi Focke,	*R. potentilloides* W. E. Evans
R. fanjingshanensis L. T. Lu ex Boufford et al.	*R. preptanthus* Focke
R. feddei H. Léveillé et Vaniot	*R. pseudopileatus* Cardot
R. flagelliflorus Focke	*R. ptilocarpus* T. T. Yu et L. T. Lu
R. flosculosus Focke	*R. pungens* Cambessèdes
R. fockeanus Kurz	*R. quinquefoliolatus* T. T. Yu et L. T. Lu
R. foliaceistipulatus T. T. Yu et L. T. Lu	*R. raopingensis* T. T. Yu et L. T. Lu
R. formosensis Kuntze	*R. reflexus* Ker Gawler
R. forrestianus Handel-Mazzetti	*R. refractus* H. Léveillé
R. fragarioides Bertoloni	*R. reticulatus* Wallich ex J. D. Hooker

Scientific Name	Scientific Name
R. fraxinifoliolus Hayata	*R. rolfei* S. Vidal
R. fraxinifolius Poiret	*R. rosifolius* Smith
R. fujianensis T. T. Yu et L. T. Lu	*R. rubrisetulosus* Cardot
R. fuscifolius T. T. Yu et L. T. Lu	*R. rufus* Focke
R. fuscorubens Focke	*R. sachalinensis* H. Léveillé
R. glabricarpus W. C. Cheng	*R. salwinensis* Handel-Mazzetti
R. glandulosocalycinus Hayata	*R. saxatilis* L.
R. glandulosocarpus M. X. Nie	*R. setchuenensis* Bureau et Franchet
R. gongshanensis T. T. Yu et L. T. Lu	*R. shihae* F. P. Metcalf
R. grandipaniculatus T. T. Yu et L. T. Lu	*R. sikkimensis* J. D. Hooker
R. grayanus Maximowicz	*R. simplex* Focke
R. gressittii F. P. Metcalf	*R. spananthus* Z. M. Wu et Z. L. Cheng
R. gyamdaensis L. T. Lu et Boufford	*R. spinulosoides* F. P. Metcalf
R. hanceanus Kuntze	*R. stans* Focke
R. hastifolius H. Léveillé et Vaniot	*R. stimulans* Focke
R. hemithyrsus Handel-Mazzetti	*R. stipulosus* T. T. Yu et L. T. Lu
R. henryi Hemsley et Kuntze	*R. subcoreanus* T. T. Yu et L. T. Lu
R. hirsutus Thunberg,	*R. subinopertus* T. T. Yu et L. T. Lu
R. howii Merrill et Chun	*R. subornatus* Focke
R. huangpingensis T. T. Yu et L. T. Lu	*R. subTibetanus* Handel-Mazzetti
R. humulifolius C. A. Meyer	*R. sumatranus* Miquel
R. hunanensis Handel-Mazzetti	*R. swinhoei* Hance
R. hypopitys Focke	*R. taitoensis* Hayata
R. ichangensis Hemsley et Kuntze	*R. taiwanicola* Koidzumi et Ohwi
R. idaeopsis Focke	*R. taronensis* C. Y. Wu ex T. T. Yu et L. T. Lu
R. idaeus L.	*R. tephrodes* Hance
R. impressinervus F. P. Metcalf	*R. thibetanus* Franchet
R. innominatus S. Moore	*R. tinifolius* C. Y. Wu ex T. T. Yu et L. T. Lu
R. inopertus (Focke) Focke	*R. treutleri* J. D. Hooker
R. irenaeus Focke	*R. trianthus* Focke
R. irritans Focke	*R. tricolor* Focke
R. jambosoides Hance	*R. trijugus* Focke
R. jianensis L. T. Lu et Boufford	*R. tsangii* Merrill
R. jinfoshanensis T. T. Yu et L. T. Lu	*R. tsangorum* Handel-Mazzetti
R. kawakamii Hayata	*R. wallichianus* Wight et Arnott
R. komarovii Nakai	*R. wangii* F. P. Metcalf
R. kulinganus L. H. Bailey	*R. wardii* Merrill
R. kwangsiensis H. L. Li	*R. wawushanensis* T. T. Yu et L. T. Lu
R. lambertianus Seringe	*R. wilsonii* Duthie
R. lanyuensis Chang	*R. wushanensis* T. T. Yu et L. T. Lu
R. lasiostylus Focke	*R. wuzhianus* L. T. Lu et Boufford
R. lasiotrichos Focke	*R. xanthocarpus* Bureau et Franchet
R. latoauriculatus F. P. Metcalf	*R. xanthoneurus* Focke
R. laxus Focke	*R. xichouensis* T. T. Yu et L. T. Lu

Scientific Name	Scientific Name
R. leucanthus Hance,	*R. yanyunii* Y. T. Chang et L. Y. Chen
R. lichuanensis T. T. Yu et L. T. Lu	*R. yiwuanus* W. P. Fang
R. lineatus Reinwardt	*R. yuliensis* Y. C. Liu et F. Y. Lu
R. lishuiensis T. T. Yu et L. T. Lu	*R. yunanicus* Kuntze
R. liui Yuen P. Yang et S. Y. Lu	*R. zhaogoshanensis* T. T. Yu et L. T. Lu

Fungi

Phylum	Family	Species	H. R.	Ref.
Ascomycota	Amphisphaeriaceae	*Coryneopsis rubi* (Westend.) Grove	oo	[1]
	Meliolaceae	*Appendiculella calostroma* (Desm.) Höhn.	po	[72]
			oo	[26]
		Meliola formosensis W. Yamam.	oo	[73]
			oo	[26]
		Meliola rubiella Hansf.	oo	[73]
	Mycosphaerellaceae	*Mycosphaerella confusa* F.A. Wolf	po	[129]
		Mycosphaerella fragariae (Tul.) Lindau	mo	[26]
		Mycosphaerella rubi Roark	oo	[26]
	Patellariaceae	*Rhytidhysterium prosopidis* Peck	mo	[26]
Basidiomycota	Incertae sedis	*Phragmotelium formosanum* (Hirats.) Thirum.	oo	[26]
		Phragmotelium okianum (Hara) Thirum.	oo	[26]
		Phragmotelium rubi-fraxinifolii (Syd. & P. Syd.) Thirum	oo	[26]
	Phragmidiaceae	*Arthuriomyces peckianus* (Howe) Cummins & Y. Hirats.	mo	[26]
		Gerwasia rubi Racib.	oo	[26]
		Hamaspora acutissima P. Syd. & Syd	oo	[26]
		Hamaspora hashiokai Hirats. f.	oo	[26]
		Hamaspora rubi-sieboldii (Kawagoe) Dietel	o‡	[26]
		Hamaspora sinica F.L. Tai & C.C. Cheo	o†	[26]
		Hamaspora tairai Hirats.	mo	[26]
		Hamaspora taiwaniana Hirats. f. & Hashioka	mo	[26]
		Phragmidium arisanense Hirats. & Hashioka	mo	[26]
		Phragmidium griseum Dietel	oo	[26]
		Phragmidium nambuanum Dietel	o†	[26]
		Phragmidium pauciloculare (Dietel) Syd. & P. Syd.	oo	[26]
		Phragmidium rubi-thunbergii Kusano	oo	[26]
		Phragmidium shensianum F.L. Tai & C.C. Cheo	oo	[26]
		Phragmidium sikangense Petr.	oo	[26]
		Phragmidium sinicum F.L. Tai & C.C. Cheo	mo	[26]
		Phragmidium violaceum (Schultz) G. Winter	mo	[26]
		Phragmidium yamadanum Hirats.	oo	[26]
Oomycota	Pythiaceae	*Phytophthora citricola* Sawada	po	[202]
Anamorphic Ascomycetes		*Acrothecium rubi* Sawada	mo	[26]

Phylum	Family	Species	H. R.	Ref.
Anamorphic *Botryotinia*		*Botrytis cinerea* Pers.	po	[26]
Anamorphic *Didymella*		*Hendersonia vulgaris* Desm.	mo	[26]
Anamorphic *Diplocarpon*		*Gloeosporium venetum* Speg.	mo	[26]
Anamorphic *Discostroma*		*Coryneopsis rubi* (Westend.) Grove	oo	[26]
Anamorphic Hypochreales		*Verticillium albo-atrum* Reinke & Berthold	po	[26]
Anamorphic *Hypocrella*		*Aschersonia tamurai* Henn.	mo	[26]
Anamorphic *Mycosphaerella*		*Pseudocercospora heteromalla* (Syd.) Deighton	mo	[129]
		Pseudocercospora rubicola (Thüm.) X.J. Liu & Y.L. Guo	mo	[129]
		Septoria brevispora Ellis & Davis	oo	[26]
		Septoria rubi var. *brevispora* Sacc.	mo	[26]
Anamorphic Uredinales		*Caeoma cheoanum* Cummins	oo	[26]

†Hosted by *Rubus phoenicolasius*
‡Hosted by *Rubus ellipticus* var. *obcordatus*
[I]Recorded as *Septoria rubi* Westendorp
[II]Recorded as *Pseudocercospora rubi* (Sacc.) Deighton
[III]Recorded as *Phragmidium formosanum* Hirats.
[IV]Recorded as *Phragmidium okianum* Hara
[V]Recorded as *Phragmidium rubi-fraxinifolii* Syd. & P. Syd.
[VI]Recorded as *Gymnoconia peckiana* (Howe) Trotter
[VII]Recorded as *Hamaspora hashiokae* Hirats
[VIII]Recorded as *Hamaspora benguetensis* Syd.

Arthropods

Order	Family	Species	H. R.	Ref
Coleoptera	Buprestidae	*Coraebus quadriundulatus* Motschulsky	mo	[94]
	Chrysomelidae	*Aphthona howenchuni* (Chen)	oo	[201]
		Batophila impressa Wang	oo	[201]
		Chaetocnema simplicifrons (Baly)	oo	[201]
		Phaedon fulvescens Weise	oo	[201]
	Curculionidae	*Enaptorrhinus convexiusculus* Heller	po	[211]
	Eumolpidae	*Basilepta leechi* (Jacoby)	po	[164]
		Basilepta ruficolle (Jacoby)	po	[164]
		Chlamisus indicus Jacoby	oo	[164]
		Chlamisus latiusculus Chûjô	mo	[164]
		Chlamisus ruficeps (Chen)	po	[164]
		Chlamisus semirufus (Chen)	po	[164]
		Chlamisus setosus (Bowditch)	m†	[164]
	Hispidae	*Alledoya vespertina* (Boheman)	po	[94]
Hemiptera	Coreidae	*Derepteryx fuliginosa* (Uhler)	po	[207]
		Derepteryx lunata (Distant)	po	[207]
	Pentatomidae	*Amyntor obscurus* (Dallas)	po	[207]
Homoptera	Aphididae	*Acyrthosiphon rubiformosanum* (Takahashi)	po	[205]

Order	Family	Species	H. R.	Ref
Lepidoptera	Geometridae	*Dysstroma cinereata* (Moore)	mo	[195]
		Dysstroma citrata (L.)	po	[195]
		Mesoleuca albicillata (L.)	po	[161]
			po	[195]
			mo	[189]
		Photoscotosia miniosata (Walker)	m†	[195]
		Plagodis dolabraria (L.)	oo	[161]
	Hesperiidae	*Abraximorpha davidii* (Mabille)	mo	[219]
	Lycaenidae	*Sinthusa chandrana* (Moore)	mo	[219]
	Noctuidae	*Acronicta rumicis* (L.)	po	[224]I
			po	[181]
		Anaplectoides prasina (Denis & Schiffermüller)		[181]
		Anomis mesogona (Walker)	oo	[224]
		Grammodes geometrica (Fabricius)	po	[224]II
			po	[11]III
		Grammodes stolida (Fabricius)	po	[224]IV
		Sypnoides picta Butler	po	[228]V
	Nymphalidae	*Argynnis paphia* (L.)	po	[219]
		Brenthis daphne (Denis & Schiffermüller)	po	[219]
		Brenthis ino (Rottemburg)	po	[219]
	Saturniidae	*Loepa damaritis* Jordan	po	[226]
	Tortricidae	*Adoxophyes orana* Fischer von Röslerstamm	po	[133]
		Ancylis comptana (Frölich)	po	[133]
		Archips xylosteana (L.)	po	[133]
		Epiblema tetragonana (Stephens)	po	[133]
		Epinotia ustulana Hübner	oo	[133]
		Olethreutes lacunana (Denis & Schiffermüller)	po	[133]VI
		Orthotaenia undulana (Denis & Schiffermüller)	po	[133]
		Syndemis perpulchrana (Kennel)	po	[133]

† Hosted by *Rubus ellipticus* var. *obcordatus*
I Recorded as *Acronycta rumicis* (L.)
II Recorded as *Chalciope geometrica* Fabricius
III Recorded as *Grammodes geometrica* (Fabricius)
IV Recorded as *Chalciope stolida* (Fabricius)
V Recorded as *Sypna picta* Butler
VI Recorded as *Argyroploce lacunana* (Denis et Schiffermuller)

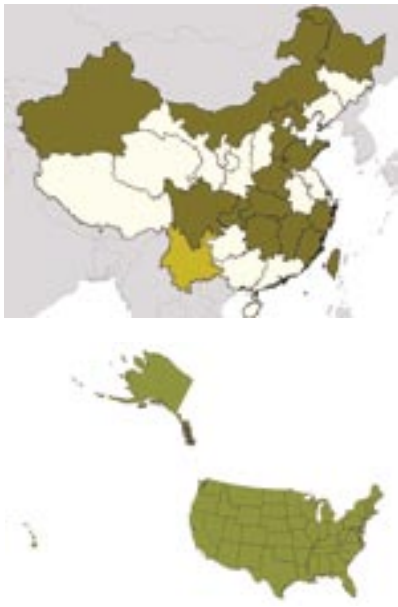
Rumex species
dock, sorrel

Introduction
The genus *Rumex* contains approximately 200 species worldwide, occurring primarily in the north temperate regions. In China 27 species occur nationwide [98].

I. *Rumex acetosella*
Sheep sorrel

Taxonomy
Order: Polygonales
Family: Polygonaceae
Subfamily: Rumicoideae Damm.
Tribe: Rumiceae Damm.
Genus: *Rumex* L.
Subgenus: acetosella (Meisn.) Rech. f.
Species: *Rumex acetosella* L.

Description
Rumex acetosella is a perennial herb with a creeping xyloid rhizome from which numerous stems are spread. The plant can reach 35 cm in height. The stems are slender and furrowed, usually branching in the upper half of the stem. The leaves are narrow-lanceolate or linear hastate, the petiole is 2-5 cm long. The middle lobe of the leaves is lanceolate or linear lanceolate, 2 - 4 cm long and 3 to 6 mm wide, with acute apex. The upper leaves are relatively slender, with a short petiole or sessile. The ochrea or stipule sheath is membranous, white to silver. From June to July, dioecious unisexual flowers occur in clusters of 2-7 in a terminal panicle. Male flowers, with 6 stamens, have elliptic inner sepals that are 1.5-1.8 mm long and larger than the lanceolate outer ones. The inner sepals of female flowers are veined, ovate and about 1.5-1.8 mm long, with acute apices and rounded bases, while the outer ones are lanceolate and about 1 mm long. The achenes are produced in July through August. The shiny, yellowish brown fruits are broadly ovate, 3-winged, and about 1-1.5 mm long[97, 98].



Species of *Rumex* in China*

Scientific Name	Scientific Name
***R. acetosa* L.**	*R. marschallianus* Reichb.
R. acetosella L.	*R. microcarpus* Campd.
R. amurensis Fr. Schm. ex Maxim.	*R. nepalensis* Spreng.
R. angulatus Rech. f.	*R. obtusifolius* L.
R. aquaticus L.	*R. patientia* L.
R. chalepensis Mill.	*R. popovii* Pachom.
R. confertus Willdenow†	*R. pseudonatronatus* (Borb.) Borb. ex Murb.
R. crispus L.	*R. similans* K. H. Rechinger†
R. dentatus L.	*R. stenophyllus* Ledeb.
R. gmelinii Turcz. ex Ledeb.	*R. thyrsiflorus* Fingerh
R. hastatus D. Don	*R. thianschanicus* Los.‡
R. japonicus Houtt.	*R. trisetifer* Stokes
R. longifolius DC.	*R. yungningensis* Sam.
R. maritimus L.	

†Not listed in *FRPS*
‡Recorded as *R. tianschanicus* Los. in *FRPS*
**R. ucranicus* Fisch. ex Spreng. is not listed in the revised *FOC*

Habitat
R. acetosella occurs on grassy slopes, forest margins, moist valleys, meadow prairies, gravel land of the steppes and

roadsides at elevations of 400-3200 m [97, 108].

Distribution

R.acetosella occurs in Fujian, Hebei, Heilongjiang, Henan, Hubei, Hunan, Inner Mongolia, Jiangxi, Shandong, Sichuan, Taiwan and Xinjiang, Zhejiang, and probably Yunnan provinces[97, 98].

Economic Importance

R. acetosella is used for goat and sheep feed in the summer and fall[108].

Related Species

R.acetosa L. is the most common species of *Rumex* in China. It occurs nationwide along hillsides, ditches, roads and forest margins at elevations of 400-4100m. It is used in Chinese medicine and the young stems and leaves are edible and also used as animal forage in some areas. *R. acetosa* is distinguished from *R. acetosella* by its sagittate basal leaves and the absence of a rhizome[97, 98].

II. *Rumex crispus*

Curly Dock, Yellow Dock

Taxonomy

Order: Polygonales
Family: Polygonaceae
Subfamily: Rumicoideae Damm.
Tribe: Rumiceae Damm.
Genus: *Rumex* L.
Subgenus: Rumex
Species: *Rumex crispus* L.

Description

R. crispus is a perennial herb with a stout yellowish-brown root. The grooved stem is 50 to 120 cm tall, and unbranched or branched at the upper part. The basal leaves are lanceolate or narrowly so, 10-25 cm long and 2-5 cm wide with a crisped, wavy margin, acute apex and cuneate base. The cauline leaves are comparatively

smaller, and narrowly lanceolate. The ochra or stipule sheath is membranous, and fragile. The inflorescence is a narrow panicle. The bisexual flower is light green, with a slender, jointed pedicel. There are 6 elliptic sepals each about 1 mm long. The inner sepals are broadly ovate, 4-5 mm long, slightly obtuse apically with a nearly truncate base, with a noticeable net of veins, and tubercles, which are ovate and 1.5-2 mm long. Flowers appear from May to June. Appearing at the end of July, the fruit is a dark brown, shiny, trigonous ovate achene[97, 98].

Habitat

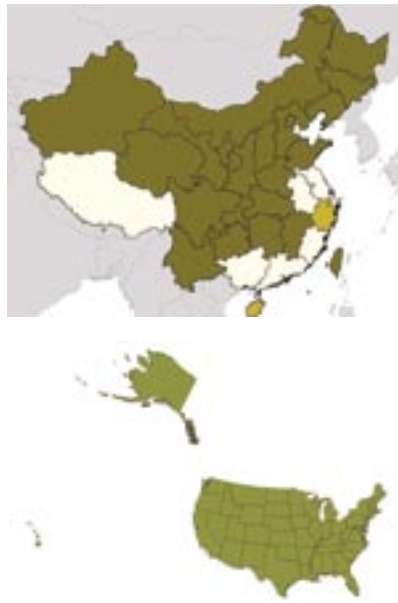
R. crispus occurs along riversides, wetland areas, and roadsides, at elevations of 30-2500 m[97, 98, 108].

Distribution

R. crispus occurs in Gansu, Guizhou, Heilongjiang, Hebei, Henan, Hubei, Hunan, Jilin, Liaoning, Inner Mongolia, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Xinjiang, Yunnan, and probably Hainan and Zhejiang provinces[98]

Related Speceis

R. crispus var. *unicallosus* Petermann also occurs in China[97].



Economic Importance

R. crispus causes damage to wheat, vegetables, and young trees when, it occurs in orchards and in crop fields[39, 108]. However, it is also industrially and medicinally useful[120].

Natural Enemies of *Rumex*

Twenty-two species of fungi have been found on members of the genus *Rumex* in China, with two from *R. acetosella* and five from *R. crispus*. Fifty-one arthropod species are recorded as associates of Rumex. One species, associated primarily with *R. acetosa* exhibits a narrow host range specificity for members of *Rumex* and *Polygonum* making it a potential biological control candidate, however *R. crispus* is the preferred feeding choice in northeastern China[107, 148].

Fungi

Phylum	Family	Species	H. R.	Ref
Ascomycota	Erysiphaceae	*Erysiphe betae* (Vaňha) Weltzien	p‡	[26]I
			p‡	[24]I
	Sclerotiniaceae	*Sclerotinia sclerotiorum* (Lib.) de Bary	po	[26]
	Venturiaceae	*Venturia rumicis* (Desm.) G. Winter	mo	[26]II
Basidiomycota	Pucciniaceae	*Puccinia acetosae* (Schumach.) Körn.	oo	[26]
			oo	[229]
		Puccinia hultenii Tranzschel & Jørst.	oo	[229]
		Puccinia namjagbarwana B. Li & J.Y. Zhuang	mo	[229]
		Puccinia nepalensis Barclay & Dietel	mo	[229]
		Puccinia ornata Arthur & Holw.	oo	[229]
		Puccinia otaniana Hirats. f.	o‡	[229]
		Puccinia phragmitis (Schumach.) Körn.	po	[170]
		Puccinia punctiformis Dietel & Holw.	o‡	[26]
		Uromyces polygoni-avicularis (Pers.) P. Karst.	po	[26]
		Uromyces rumicis (Schumach.) G. Winter	oo	[26]III
	Ustilaginaceae	*Ustilago hsuii* Y.C. Wang	oo	[26]
		Ustilago kuehneana R. Wolff	oo	[64]
		Ustilago rumicis (Berk.) G.P. Clinton	oo	[26]
		Ustilago warmingii Rostr.	mo	[26]
			mo	[64]
Oomycota	Peronosporaceae	*Peronospora rumicis* Corda	p†	[202]
	Pythiaceae	*Pythium helicandrum* Drechsler	m†	[202]
Anamorphic *Guignardia*		*Phyllosticta rumicicola* Miura	o‡	[26]
Anamorphic *Mycosphaerella*		*Ramularia decipiens* Ellis & Everh.	oo	[26]
			oo	[26]
		Ramularia rumicis-crispi Sawada	o‡	[26]

[I]Recorded as *Erysiphe polygoni* DC
[II]Recorded as *Mycosphaerella rumicis* (Desm.) Cooke
[III]Recorded as *Uromyces rumicis* (Schum.) Wint.
†Species found on *Rumex acetosella*
‡Species found on *Rumex crispus*

Arthropods

Order	Family	Species	H. R.	Ref.
Coleoptera	Chrysomelidae	*Gallerucella grisescens* (Joannis)	po	[201]
		Gallerucida bifasciata Motschulsky	po	[201]
		Gastrophysa atrocyanea (Motschulsky)	po	[165]
		Hespera brachyelytra Chen & Wang	po	[165]
			po	[201]
Hemiptera	Lygaeidae	*Lygaeus vicarius* Winkler & Kerzhner	po	[208]
	Pentatomidae	*Hoplistodera fergussoni* Distant	po	[208]
		Sepontia aenea Distant	mo	[208]
Homoptera	Aphididae	*Aphis rumicis* L.	m	[205]
			m	[113]

Order	Family	Species	H. R.	Ref.
Lepidoptera	Arctiidae	*Phragmatobia fuliginosa* (L.)	po	[45]
			po	[44]
			po	[25]
		Spilosoma urticae (Esper)	po	[44]
			po	[45]
			po	[25]
	Crambidae	*Loxostege verticalis* L.	po	[169]
		Mesographe forficalis L.	po	[169]
		Pyrausta memnialis Walker	mo	[169]
	Geometridae	Calothysanis amata (L.)	oo	[25]I
		Dysstroma citrata (L.)	po	[195]
		Lythria purpuraria (L.)	po	[195]
		Lythria sp.	po	[25]
		Orthonama obstipata (Fabricius)	mo	[195]
			mo	[161]II
		Xanthorhoe quadrifasciata (Clerck)	po	[195]
	Lycaenidae	*Heliophorus ila matsumurae* (Fruhstorfer)	po	[219]
		Lycaena phlaeas (L.)	o2	[219]III
			o	[219]III
	Noctuidae	*Agrotis clavis* (Hüfnagel)	po	[181]IV
			po	[166]IV
		Agrotis exclamationis (L.)	po	[166]
		Aletia l-album (L.)	po	[25]V
		Anaplectoides prasina (Denis & Schiffermüller)	po	[11]
			po	[181]
		Apamea characteria (Denis & Schiffermüller)	po	[15]VI
		Apamea crenata (Hüfnagel)	po	[166]VII
		Atrachea nitens (Butler)	m	[11]
		Cerastis rubricosa (Denis & Schiffermüller)	po	[15]
		Diarsia brunnea (Denis & Schiffermüller)	po	[15]
			po	[166]
		Diarsia canescens (Butler)	po	[166]
		Graphiphora augur (Fabricius)	po	[15]
		Hadena reticulata (Villers)	po	[228]VIII
		Heliophobus reticulata (Goeze)	po	[75]
			po	[166]
			po	[25]
		Hoplodrina alsines (Brahm)	po	[15]IX
			po	[166]IX
		Hoplodrina blanda (Denis & Schiffermüller)	po	[15]X
		Lacanobia contigua (Denis & Schiffermüller)	po	[25]
		Lacanobia suasa (Denis & Schiffermüller)	po	[25]XI
			po	[15]XI
		Leucania comma (L.)	po	[15]

Order	Family	Species	H. R.	Ref.
		Naenia contaminata (Walker)	po	[224]
			po	[11]
		Noctua pronuba (L.)	po	[15]
		Polia illoba (Butler)	p	[228]
		Simyra nervosa (Schiffermüller)	po	[15]
		Trachea atriplicis (L.)	po	[224]
		Valeria viridimacula (Graeser)	oo	[228]XII
		Xestia c-nigrum (L.)	po	[166]XIII
		Xestia triangulum (Hüfnagel)	po	[11]XIV
			po	[181]XIV
			po	[178]XIV
			po	[224]XIV
		Xestia umbrosa (Hübner)	po	[15]XV
		Xylena formosa (Butler)	po	[224]XVI
	Sphingidae	*Celerio lineata livornica* (Esper)	po	[225]
			p	[227]
		Hippotion celerio (L.)	po	[225]
			po	[227]

[I]Recorded as *Timandra amata* L.
[II]Recorded as *Nycterosea obstipata* (Fabricius)
[III]Regarded as another family (Internet)
[IV]Recorded as *Agrotis corticea* (Schiffermuller)
[V]Recorded as *Leucania l-album* L.
[VI]Recorded as *Apamea hepatica* (L.)
[VII]Recorded as *Apamea rurea* Fabricius
[VIII]Probably *Heliophobus reticulata* (Goeze)
[IX]Recorded as *Athetis alsines* (Brahm)
[X]Recorded as *Athetis blanda* (Schiffermüller)
[XI]Recorded as *Polia suasa* (Schiffermüller)
[XII]Recorded as *Valeriodes viridimacula* (Graeser)
[XIII]Recorded as *Amathes c-nigrum* L.
[XIV]Recorded as *Agrotis triangulum* (Hüfnagel)
[XV]Recorded as *Amathes sexstrigata* (Haworth)
[XVI]Recorded as *Xylina formosa* (Bütler)

Sapium sebiferum
Triadica sebifera
Chinese tallow tree

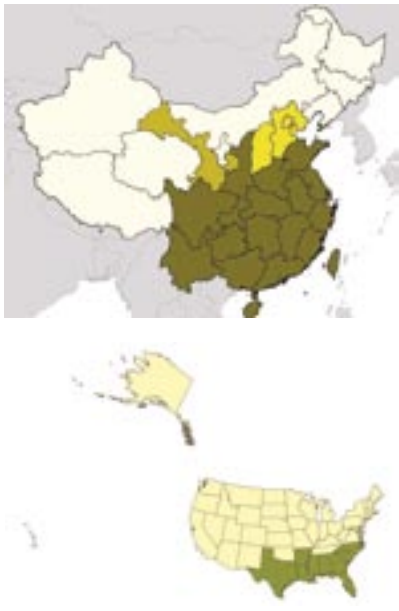
Introduction
The genus *Sapium* consists of approximately 120 species worldwide. Members of the genus occur primarily in tropical regions, especially in South America. Nine species occur in the low hills of southeastern and southwestern China[16].

Taxonomy
Order: Geraniales
Suborder: Euphorbiineae
Family: Euphorbiaceae
Subfamily: Euphorbioideae
Tribe: Hippomaneae Reichb.
Genus: *Sapium* P. Br.
Section: Triadica (Lour.) Muell. Arg
Species: *Sapium sebiferum* (L.) Roxb. (=*Triadica sebifera* (L.) Small)

Species of *Sapium* in China

Scientific Name	Scientific Name
***S. sebiferum* (L.) Roxb.**	*S. insigne* (Royle) Benth. ex Hook. f.
S. atrobadiomaculatum Metcalf	*S. japonicum* (Sieb. et Zucc.) Pax et Hoffm.(Sieb.)
S. baccatum Roxb.	
S. chihsinianum S. K. Lee	*S. pleiocarpum* Y. C. Tseng
S. discolor (Champ. ex Benth.) Muell. Arg.	*S. rotundifolium* Hemsl.

Description
Sapium sebiferum is a deciduous tree that can reach 15 m in height. Most parts of the plant are glabrous. The bark is gray to whitish-gray with vertical cracks. The alternate leaves are broad rhombic to ovate 3-8 cm long and 3-8 cm wide, entire margin, and a cordate-acuminate apex and a rounded base. The petiole is slender, 2.5-6 cm long, bearing 2 glands in the terminal. The stem contains a milky, poisonous sap. Flowers are monoecious, without petals or flower discs, arranged as terminal spikes. The slender male flowers have a 3-lobed cuplike calyx and 2 stamens with separated filaments. One to four female flowers appear at the base of the inflorescence. The female flower is borne on the pedicel, which is 2-4 mm long with 2 kidney-shaped glands in the base. The flowers appear from April through August. Fruits are pear-shaped globular capsules 1-1.5 cm in diameter. Each fruit contains 3 black seeds that are flat globular and covered with a waxy, white arils at maturity[16].



Habitat
S. sebiferum occurs occurs in open areas, edges of crop fields, sparse forests, and near bodies of water at elevations below 1200 m. It is also planted as an ornamental along roadsides[16, 82, 88].

Distribution
S. sebiferum occurs in Anhui, Fujian,, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Shandong, Sichuan, Taiwan, Yunnan, Zhejiang, and possibly Gansu, most of which are provinces south of the Yellow River.[17, 86] It is also cultivated in Hebei and Shanxi[19, 48].

Economic Importance

The rigidity and fine texture of the light colored wood makes *S. sebiferum* suitable for construction and furniture making. The outer root covering has medicinal value. The leaves are a source for a black dye. The wax-coated seeds are a source of candle wax, and fatty acids for soap making. The leaves are a food source for the larvae of the atlas moth, *Attacus atlas* (Lepidoptera: Saturniidae)[16, 82]. In addition, *S. sebiferum* is a nectariferous plant[88, 179]

Natural Enemies of *Sapium*

Three species of fungi have been found on *S. sebiferum*. *Stigmina sapii* is reported to cause abnormal leaf drop of *S. sebiferum*[26, 147].

One hundred fifteen species of arthropods have been reported to damage members of the genus *Sapium*. Most of them are foliage feeders. A detailed review on the arthropod species associated with *Sapium* can be found in *Cultivation of Chinese Tallow Tree* [163, 190, 193].

Fungi

Phylum	Family	Species	H. R.	ref
Ascomycota	Erysiphaceae	*Phyllactinia guttata* (Wallr.) Lév.	p	[26]I
		Phyllactinia sapii Sawada	m	[24]
	Meliolaceae	*Meliola sapiicola* Y.X. Hu & B. Song	mo	[158]
Anamorphic Mycosphaerella		*Cercospora stillingiae* Ellis & Everh.	oo	[26]
		Pseudocercospora sapii-sebiferi Sawada ex Goh & W.H. Hsieh	m	[129]
Anamorphic Otthia		*Stigmina sapii* (J. Miyake) M.B. Ellis	m	[26]II

I Recorded as *Phyllactinia corylea* (Pers.) Karst.

II Recorded as *Cercospora micromera* Syd. and *Helminthosporium sapii* Miyake

Arthropods

Order	Family	Species	H. R.	Ref.
Acariformes	Eriophyidae	*Phyllocoptruta sapii* Kuang & Zhuo	m	[90]
Coleoptera	Attelabidae	*Apoderus bicallosocollis* Voss	m	[75]
		Apoderus nigroapicatus Jekel	p	[75]
	Cerambycidae	*Aeolesthes holosericea* (Fabricius)	po	[13]
		Aeolesthes induta (Newman)	p	[13]
		Anoplophora chinensis (Förster)	p	[193]
			p	[190]
		Apriona germari (Hope)	p	[193]
		Batocera horsfieldi (Hope)	p	[13]
			p	[94]
			†	[163]
			p	[193]
			p	[190]
		Batocera lineolata Chevrolat	p	[75]
			p	[94]
			p	[165]
		Erythrus championi White	p	[94]
		Philus antennatus (Gyllenhal)	p	[178]
		Rhaphipodus gahani Lameere	m	[86]
	Cetoniidae	*Cetonia pilifera* (Motschulsky)	p	[94]
		Poecilophilides rusticola (Burmeister)	p	[94]
	Chrysomelidae	*Aphthonomorpha collaris* (Baly)	m	[75]
			m	[94]
			m	[201]
		Morphosphaera japonica Hornstedt	m	[94]

Order	Family	Species	H. R.	Ref.
	Curculionidae	*Alcidodes erro* (Pascoe)	p	[6]
			m	[94]
			p	[178]
		Chlorophanus auripes Faust	p	[94]
		Eucryptorrhynchus chinensis (Olivier)	p	[94]
		Hypomeces squamosus Fabricius	p	[193]
	Eumolpidae	*Colasposoma dauricum auripenne* (Motschulsky)	p	[94]
		Cryptocephalus fortunatus Baly	p	[94]
	Melolonthidae	*Apogonia cribricollis* Burmeister	p	[94]
		Holotrichia plumbea Hope	‡	[193]
		Holotrichia trichophora (Fairmaire)	p	[94]
			p	[193]
		Maladera orientalis Mots	p	[193]
	Rutelidae	*Adoretus sinicus* Burmeister	‡	[193]
			p	[190]
		Adoretus tenuimaculatus Waterhouse	p	[94]
			p	[190]
		Anomala antiqua (Gyllenhal)	‡	[193]
		Anomala corpulenta Motschulsky	‡	[193]
		Anomala cuprea Hope	p	[94]
		Popillia quadriguttata (Fabricius)	‡	[193]
Hemiptera	Acanthosomatidae	*Elasmucha nipponica* (Esaki & Ishihara)	p	[208]
	Coreidae	*Physomerus grossipes* (Fabricius)	p	[208]
	Pentatomidae	*Eurostus validus* Dallas	p	[207]
		Rhaphigaster genitalia Yang	p	[208]
	Urostylidae	*Urochela distincta* Distant	p	[94]
			p	[207]
Homoptera	Aphididae	*Aphis* sp.	†	[163]
		Toxoptera odinae (van der Goot)	p	[75]
			m	[94]
			p	[165]
			p	[178]
			p	[205]
	Cicadellidae	*Erythroneura subrufa* (Motschulsky)	p	[193]
		Nephotettix bipunctatus cincticeps (Uhler)	p	[193]
		Tettigoniella viridis (Linné)	p	[193]
	Cicadidae	*Gaeana muculata consors* Distant	m	[75]
	Coccidae	*Ceroplastes japonicus* Green	p	[94]
		Parasaissetia nigra (Nietner)	p	[173]
		Saissetia formicarii (Green)	p	[173]
	Diaspididae	*Aulacaspis rosarum* Borchsennius	p	[190]
		Fiorinia fioriniae (Targioni-Tozzetti)	p	[94]
		Lepidosaphes tubulorum Ferris	p	[94]
		Pseudaulacaspis pentagona (Targioni-Tozzetti)	p	[178]
	Flatidae	*Geisha distinctissima* (Walker)	p	[94]

Order	Family	Species	H. R.	Ref.
	Fulgoridae	*Fulgora candelaria* (L.)	p	[220]
		Fulgora watanabei Matsumura	m	[220]
	Margarodidae	*Icerya purchasi* Maskell	p	[193]
	Membracidae	*Hypsauchertia chinensis* Chou	p	[190]
		Tricentrus aleuritis Chou	p	[178]
	Ricaniidae	*Ricania speculum* (Walker)	p	[94]
Isoptera	Termitidae	*Odontotermes formosanus* (Shiraki)	p	[193]
Lepidoptera	Arctiidae	*Aloa lactinea* (Cramer)	p	[94]I
		Camptoloma interiorata (Walker)	p	[44]
			p	[190]
			p	[75]
			p	[94]
			p	[193]
	Brahmaeidae	*Brahmaea hearseyi* (White)	p	[75]
	Cossidae	*Arbela dea* Swinhoe	p	[94]
		Zeuzera coffeae Nietner	p	[94]
			p	[193]
			p	[190]
	Eupterotidae	*Eupterote chinensis* Leech	p	[94]
		Eupterote sapivora Yang & Yang	p	[190]
			p	[196]
	Geometridae	*Biston marginata* Matsumura	p	[94]
			p	[190]
		Buzura suppressaria Guenee	p	[190]
			p	[178]
			p	[94]
			‡	[193]
		Comibaena procumbaria (Pryer)	p	[178]
	Hepialidae	*Phassus sinifer sinensis* Moore	p	[193]
	Lasiocampidae	*Trabala vishnou* Lefebure	p	[193]
	Limacodidae	*Latoia hilarata* (Staudinger)	p	[190]
		Monema flavescens Walker	p	[94]II
			‡	[193]II
			p	[190]II
			p	[75]
		*Parasa consocia*Walker	p	[94]
			†	[163]
			‡	[193]
		Parasa hilarata (Staudinger)	p	[94]
		Parasa pseudorepanda Hering	p	[94]
		Parasa sinica Moore	p	[94]
		Phocoderma velutina Kollar	p	[94]

Order	Family	Species	H. R.	Ref.
		Setora postornata (Hampson)	p	[94]
			†	[163]
			‡	[193]
			p	[190]
		Thosea sinensis (Walker)	p	[75]
			p	[94]
			p	[178]
			‡	[193]
	Lymantriidae	*Artaxa flava* (Bremer)	p	[94]III
		Euproctis bipunctapex (Hampson)	p	[212]
			p	[75]
			p	[94]
			†	[163]
			p	[166]
			p	[178]
			p	[193]
			p	[190]
		Euproctis pseudoconspersa Strand	p	[212]
			p	[94]
			p	[178]
			p	[193]
			p	[190]
		Euproctis similis xanthocampa Dyar.	p	[193]IV
		Lymantria xylina Swinhoe	p	[193]
		Porthesia atereta Collenette	p	[94]
			p	[166]
			p	[178]
		Porthesia scintillans (Walker)	p	[75]
	Noctuidae	*Agrotis ipsilon* (Hufnagel)	†	[163]V
		Dysgonia stuposa Fabricius	p	[94]VI
		Grammodes geometrica (Febricius)	p	[94]VII
		Iscadia inexacta (Walker)	m	[224]VIII
			m	[75]VIII
			m	[94]VIII
			m	[178]VIII
			m	[190]VIII
	Oecophoridae	*Odites xenophaea* (Meyrick)	p	[190]
	Papilionidae	*Papilio polytes* L.	p	[94]
	Psychidae	*Acanthopsyche subferalbata* Hampson	‡	[193]
		Chalioides kondonis Kondo	p	[94]
			†	[163]
			‡	[193]
		Clania minuscula Butler	p	[94]IX
			p	[94]IX
			†	[163]IX

Order	Family	Species	H. R.	Ref.
		Clania variegata Snellen	p	[94]X
			†	[163]X
			‡	[193]X
		Dappula tertia Templeton	p	[190]
		Mahasena colona Sonan	p	[94]
			p	[190]
	Saturniidae	*Actias artemis artemis* (Bremer & Gray)	p	[226]
			p	[75]
		Actias heterogyna Mell	p	[226]
		Actias selene ningpoana Felder	p	[75]
			p	[94]
			†	[163]
			p	[166]
			p	[193]
			p	[226]
			p	[190]
		Antheraea frithii javanensis Bouvier	p	[226]
			p	[178]
		Attacus atlas (L.)	p	[75]
			p	[226]
		Caligula anna Moore	p	[226]
		Eriogyna pyretorum (Westwood)	p	[190]
		Eriogyna pyretorum lucifera Jordan	p	[226]
		Samia cynthia (Drurvy)	p	[75]XI
			p	[94]XI
			†	[163]XI
			p	[166]XI
			p	[193]XI
			p	[190]XII
			p	[178]XII
			p	[226]
		Samia cynthia canningi (Hutton)	p	[226]
		Samia cynthia ricina (Donovan)	p	[178]XIII
			p	[226]
	Tortricidae	*Archips piceana* (L.)	p	[193]
		Gatesclarkeana idia Diakonoff	m	[190]
	Zygaenidae	*Soritia pulchella sexpunctata* Walker	p	[94]
Orthoptera	Pyrgomorphidae	*Atractomorpha sinensis* I. Bolivar	p	[94]
Phasmida	Phasmatidae	*Baculum saussure* (Saussure)	p	[190]
Thysanoptera	Thripidae	*Selenothrips rubrocinctus* (Giard)	p	[66]
			p	[75]

†pest list appendix of Chinese literature
‡Not described in the literature
[I]Recorded as *Amsacta lactinea* (Cramer)
[II]Recorded as *Cnidocampa flavescens* (Walker)
[III]Possiblee synonym of *Euproctis flava* (Bremer). According to the Chinese name it may be *Euproctis chrysorrhoea* (L.)
[IV]Possibly *Euproctis similis* (Fuesslly)

[V]Recorded as *Agrotis ypsilon* (Rottemberg)
[VI]Recorded as *Parallelia stuposa* Fabricius
[VII]Recorded as *Chalciope geometrica* Fabricius
[VIII]Recorded as *Gadirtha inexacta* Walker
[IX]Recorded as *Cryptothelea minuscula* Butler
[X]Recorded as *Cryptothelea variegata* Snellen
[XI]Recorded as *Philosamia cynthia* Walker & Felder
[XII]Recorded as *Philosamia cynthia walkeri* Felder & Felder
[XIII]Recorded as *Philosamia cynthia ricina* Donovan

Setaria faberii
Giant foxtail

Introduction
The genus *Setaria* consists of approximately 130 species, occurring in tropical and temperate regions. Although some *Setaria* species thrive in Africa, additional species extend into the Arctic Circle. In China, 15 species, 3 subspecies, and 5 varieties have been recorded. Most members of the genus *Setaria* are of economically important[156].

Taxonomy
Order: Graminales
Suborder: Gramineae
Family: Gramineae (Poaceae)
Subfamily: panicoideae A. Br.
Tribe: Paniceae R. Br.
Subtribe: Setariinae Dum.
Genus: *Setaria* Beauv.
Section: Setaria
Species: *Setaria faberii* Herrm.

Description
Setaria faberi is an annual grass with prop roots. The glabrous culm is rigid and erect, 50 to 120 cm in height and 6 mm in diameter. The sheath is loose with a ciliated margin, but glabrous and membranous at the base of the culm. The ligules are densely ciliate, 1-2 mm long.

Species of *Setaria* in China

Scientific Name	Scientific Name
S. arenaria Kitag.	*S. italica* (L.) Beauv.
S. chondrachne (Steud.) Honda	*S. pallidifusca* (Schumach.) Stapf et Hubb.†
***S. faberi* Herrm.**	*S. palmifolia* (Koen.) Stapf
S. forbesiana (Nees) Hook. f.	*S. plicata* (Lam.) T. Cooke
S. geniculata (Lam.) Beauv.†	*S. verticillata* (L.) Beauv.
S. glauca (L.) Beauv.‡	*S. viridis* (L.) Beauv.
S. guizhouensis S. L. Chen et G. Y. Sheng	*S. yunnanensis* Keng et K. D. Yu ex Keng f. et Y. K. Ma
S. intermedia Roem. et Schult.	

†Listed as *S. parviflora* (Poiret) Kerguélen revised *FOC*[188]
‡Listed as*S. palmifolia* (J. König) Stapf revised *FOC*[188]

Leaves are linear lanceolate, 10-40 cm long and 5-20 mm wide, apex acuminate and base obtuse or attenuate, margin serrate, glabrous or sparsely vesiculose on the upper surface, but rarely so on the under side,. The inflorescences is dense a cylindrical panicle, 5 to 24 cm long, drooping, with densely pubescent rachis. The spikelets are elliptical, 3 mm long bearing 1-3 coarse, green to light purplish brown bristles 5-15 mm in length, The lower glume is broadly ovate and 3-veined with a tapering tip approximately 1/3-1/2 of the length of the spikelet. The upper glume is nearly 3/4 the length of the spikelet, tapering at the apex. The upper lemma is rugose. The lower lemma is membranous and lanceolate. The fruits appear from July to October[156].

Habitat
S. faberi occurs on hill slopes, roadsides,

and in crop fields, orchards and wastelands[156].

Distribution

Setaria faberi is reported to occur in Anhui, Guizhou, Guangxi, Heilingjiang, Hubei, Hunan, Jiangsu, Jiangxi, Sichuan, Taiwan and Zhejiang[156].

Economic Importance

The young leaves, culms and grains of some species are used for forage. It is sometimes planted for conservation of soil and water and sand stabilization for embankment protection[156].

Related Species

S. viridis (L.) Beauv. is often confused with *S. faberi*, but the latter has broader acute spikelets and a shorter upper glume clearly exposing the tip of the upper lemma while the upper glume of *S. viridis* almost completely covers the upper lemma and the spikelets are usually obtuse[188]. *S. viridis* is a common weed occurring in crop fields, wastelands and roadsides nationwide below 4000 m elevation [156].

Natural Enemies of *Setaria*

Sixty three species of fungi have been recorded from members of the genus *Setaria* in China, but few are reported from *Setaria faberi.* Approximately 73 arthropods attack members of the genus *Setaria*, but few arthropod species attack *S. faberi*.

Fungi

Phylum	Family	Species	H. R.	Ref.
Ascomycota	Glomerellaceae	*Glomerella graminicola* D.J. Politis	po	[26]I
	Incertae sedis	*Khuskia oryzae* H.J. Huds.	po	[26]II
		Monographella nivalis var. *nivalis*	po	[26]
	Leptosphaeriaceae	*Leptosphaeria sacchari* Breda de Haan	po	[26]III
	Magnaporthaceae	*Gaeumannomyces graminis* var. *graminis* (Sacc.) Arx & D.L. Olivier	po	[26]IV
		Magnaporthe grisea (T.T. Hebert) M.E. Barr	po	[26]V
			po	[210]V
	Meliolaceae	*Meliola setariae* Hansf. & Deighton	po	[73]
	Nectriaceae	*Gibberella acuminata* C. Booth	po	[26]VI
		Gibberella avenacea R.J. Cook	po	[26]VII
		Gibberella intricans Wollenw.	po	[26]VIII
		Gibberella moniliformis Wineland	po	[26]IX
		Gibberella zeae (Schwein.) Petch	po	[26]X
	Phyllachoraceae	*Phyllachora graminis* var. *graminis* (Pers.) Fuckelel	po	[26]XI
		Phyllachora setariicola Speg.	mo	[26]XII
			po	[26]XIII
			mo	[26]XIV
	Pleosporaceae	*Cochliobolus miyabeanus* (S. Ito & Kurib.) Drechsler ex Dastur	oo	[26]
		Cochliobolus sativus (S. Ito & Kurib.) Drechsler ex Dastur	po	[26]
		Cochliobolus setariae (S. Ito & Kurib.) Drechsler ex Dastur	oo	[26]
Basidiomycota	Atheliaceae	*Athelia rolfsii* (Curzi) C.C. Tu & Kimbr.	po	[26]XV
			oo	[26]XVI
	Ceratobasidiaceae	*Thanatephorus cucumeris* (A.B. Frank) Donk	po	[26]XVII
	Pucciniaceae	*Puccinia graminis* Pers.	po	[26]
		Puccinia panici-montani Fujik. ex Ramachar & Cummins	mo	[26]
			oo	[170]
		Puccinia setariae-forbesianae Tai	mo	[170]
			mo	[26]
		Puccinia setariae-viridis Dietel	mo	[26]

Phylum	Family	Species	H. R.	Ref.
		Uromyces setariae-italicae Yoshino	po	[26]XVIII
			oo	[26]
	Tilletiaceae	*Tilletia setariae* L. Ling	oo	[26]
	Ustilaginaceae	*Macalpinomyces tanakae* (S. Ito) Vánky	oo	[64]XIX
		Ustilago crameri Körn.	po	[26]
			o	[64]
		Ustilago neglecta Niessl	o	[64]
			oo	[26]
		Ustilago syntherismae (Schwein.) Peck	po	[26]
Oomycota	Pythiaceae	*Pythium aristosporum* Vanterp.	oo	[202]
		Pythium arrhenomanes Drechsler	po	[202]
		Pythium monospermum Pringsh.	po	[202]
		Pythium tardicrescens Vanterp.	po	[202]
	Sclerosporaceae	*Sclerospora graminicola* (Sacc.) J. Schröt.	oo	[26]
			po	[202]
Anamorphic Ascomycetes		*Ustilaginoidea setariae* Bref.	mo	[26]
		Ustilaginoidea virens (Cooke) Takah.	p	[26]
Anamorphic *Balansia*		*Ephelis japonica* Henn.	po	[26]
Anamorphic *Gibberella*		*Fusarium compactum* (Wollenw.) W.L. Gordon	mo	[26]XX
		Fusarium concolor Reinking	po	[26]
		Fusarium culmorum (W.G. Sm.) Sacc.	po	[26]
		Fusarium diversisporum Sherb.	po	[26]
		Fusarium heterosporum Nees	po	[26]
		Fusarium nivale (Fr.) Ces. *var. satariae* You et Lou	mo	[26]
		Fusarium orthoceras var. *longius* (Sherb.) Wollenw.	po	[26]
		Fusarium poae (Peck) Wollenw.	po	[26]
		Fusarium scirpi var. *caudatum* (Wollenw.) Wollenw.	mo	[26]
		Fusarium sporotrichioides Sherb.	mo	[26]
Anamorphic *Guignardia*		*Phyllosticta setariae* Ferraris	oo	[26]
Anamorphic *Lewia*		*Alternaria alternata* (Fr.) Keissl.	po	[26]
			po	[209]
		Alternaria setariae T.Y. Zhang	mo	[209]
Anamorphic *Magnaporthe*		*Pyricularia setariae* Y. Nisik.	po	[26]XXII
			oo	[210]
Anamorphic *Mycosphaerella*		*Cercospora fusimaculans* G.F. Atk	po	[65]XXI
		Cercospora fusimaculans G.F. Atk.	po	[26]
		Cercospora setariae G.F. Atk.	mo	[26]
		Cladosporium cladosporioides (Fresen.) G.A. de Vries	po	[210]
		Cladosporium herbarum (Pers.) Link	po	[210]
		Cladosporium herbarum var. *lablab* Sacc.	mo	[26]
Anamorphic Mycosphaerellaceae		*Ascochyta graminicola* Sacc.	po	[26]
			po	[1]
		Ascochyta sorghi Sacc.	po	[26]XXIII
Anamorphic *Splanchnonema*		*Helminthosporium yamadae* Y. Nisik.	po	[26]

Phylum	Family	Species	H. R.	Ref.
Anamorphic *Tapesia*		*Ramulispora sorghicola* E. Harris	po	[26]
Anamorphic Uredinales		*Uredo panici-plicati* Sawada	oo	[26]
		Uredo setariae-excurrentis Y.C. Wang	mo	[26]

[I]Recorded as *Colletotrichum graminicolum* (Ces.) Wils.
[II]Recorded as *Nigrospora oryzae* (Berk. et Br.) Petch
[III]Recorded as *Phyllosticta sorghina* Sacc.
[IV]Recorded as *Gaeumannomyces graminis* (Sacc.) Arx et Olivier
[V]Recorded as *Pyricularia grisea* (Cooke) Sacc.
[VI]Recorded as *Fusarium scirpi* Lamb. et Fautr.
[VII]Recorded as *Fusarium avenaceum* (Fr.) Sacc.
[VIII]Recorded as *Fusarium equiseti* (Corda) Sacc.
[IX]Recorded as *Fusarium moniliforme* Sheld.
[X]Recorded as *Fusarium graminearum* Schw.
[XI]Recorded as *Phyllachora graminis* (Pers.) Fuckel
[XII]Recorded as *Phyllachora evanssi* Syd.
[XIII]Recorded as *Phyllachora pazschkeana* Sdy.
[XIV]Recorded as *Phyllachora vanderystii* Theiss. et Syd.
[XV]Recorded as *Corticium centrifugum* (Lév.) Bres.
[XVI]Recorded as *Sclerotium rolfsii* Sacc
[XVII]Recorded as *Corticium sasakii* (Shirai) Matsum.
[XVIII]Recorded as *Uromyces leptodermus* Syd.
[XIX]Recorded as *Ustilago tanakae* S. Ito
[XX]Recorded as *Fusarium scirpi* Lamb. et Fautr. *var. campactum* Wollenw
[XXI]Recorded as *Piricularia setariae* Nishik.
[XXII]Recorded as *Phaeoramularia fusimaculans* (Atk.) X. J. Liu & Y. L. Guo
[XXIII]Recorded as *Mycosphaerella ceres* Sacc.

Arthropods

Order	Family	Species	H. R.	Ref.
Coleoptera	Chrysomelidae	*Apophylia flavovirens* (Fairmaire)	po	[201]
			po	[75]
		Chaetocnema basalis (Baly)	po	[75]
			po	[201]
		Chaetocnema hortensis (Geoffroy)	po	[201]
		Chaetocnema ingenua (Baly)	po	[75]
			po	[201]
		Hespera lomasa Maulik	po	[165]
		Sphaeroderma apicale Baly	po	[201]
	Crioceridae	*Oulema atrosuturalis* (Pic)	po	[164]
		Oulema oryzae (Kuwayama)	po	[164]
		Oulema tristis (Herbst)	po	[164]
	Curculionidae	*Stelorrhinoides freyi* (Zumpt)	po	[6]
Hemiptera	Coreidae	*Aeschyntelus chinensis* Dallas	po	[207]
		Aeschyntelus notatus Hsiao	po	[207]
		Cletus tenuis Kiritshenko	p	[207]
		Leptocorisa chinensis Dallas	po	[207]

Order	Family	Species	H. R.	Ref.
		Leptocorisa lepida Breddin	m	[208]
		Leptocorisa varicornis (Fabricius)	po	[207]
		Liorhyssus hyalinus (Fabricius)	po	[207]
		Riptortus linearis (Fabricius)	po	[207]
		Riptortus pedestris (Fabricius)	po	[207]
	Cydnidae	*Adrisa magna* Uhler	po	[207]
		Stibaropus formosanus Takado & Yamagihara	po	[207]
	Lygaeidae	*Cavelerius saccharivorus* (Okajima)	po	[207]
		NySius ericae (Schilling)	po	[207]
		Pachygrontha antennata (Uhler)	po	[207]
	Miridae	*Trigonotylus ruficonis* Geoffroy	p	[207]
	Pentatomidae	*Dolycoris baccarum* (L.)	po	[207]
		Euryaspis flavescens Distant	po	[207]
		Eysarcoris parvus Uhler	po	[208]
		Megarrhamphus hastatus (Fabricius)	po	[207]
		Nezara viridula (L.)	po	[207]
		Piezodorus rubrofasciatus (Fabricius)	po	[207]
		Rubiconia intermedia (Wolff)	po	[207]
		Scotinophara lurida (Burmeister)	po	[207]
		Stollia guttiger (Thunberg)	po	[75]I
			po	[207]
		Stollia ventralis (Westwood)	po	[207]
Homoptera	Aphididae	*Rhopalosiphum maidis* (Fitch)	p	[205]
			po	[178]
		Schizaphis graminum (Rondani)	p	[205]
	Cicadellidae	*Tettigoniella viridis* (L.)	po	[57]
	Cixiidae	*Oliarus apicalis* (Uhler)	po	[220]
	Derbidae	*Diostrombus politus* Uhler	po	[220]
	Meenopliidae	*Nisia atrovenosa* (Lethierry)	po	[220]
Lepidoptera	Crambidae	*Chilo auricilius* Dudgeon	po	[169]
		Chilo suppressalis (Walker)	po	[178]
			po	[169]
		Dichocrocis chlorophanta Butler	po	[169]
		Marasmia trapezalis Guenée	po	[169]
		Marasmia venilialis Walker	po	[178]
		Ostrinia nubilalis (Hübner)	p	[169]
	Geometridae	*Culcula panterinaria* (Bremer & Grey)	po	[78]
	Hesperiidae	*Borbo cinnara* (Wallace)	po	[219]
			po	[178]
		Polytremis zina (Eversman)	po	[178]
		Telicota ohara formosana Fruhstorfer	po	[219]
	Noctuidae	*Agrotis trifurca* Eversmann	po	[166]

Order	Family	Species	H. R.	Ref.
		Euxoa oberthuri Leech	po	[166]
		Leucania venalba Moore	po	[178]
		Pseudaletia separata (Walker)	po	[178]II
		Sesamia inferens (Walker)	po	[178]
		Spodoptera depravata Butler	po	[166]III
		Xestia triangulum (Hüfnagel)	po	[224]IV
	Notodontidae	*Phalera flavescens* (Bremer & Grey)	po	[4]
	Pyralidae	*Mampava bipunctella* Ragonot	po	[169]
		Proceras venosatum (Walker)	po	[169]V
	Saturniidae	*Attacus atlas* (L.)	p	[226]
			po	[75]
	Satyridae	*Melanitis phedima* Cramer	po	[219]
		Melanitis phedima polishana Fruhstorfer	po	[219]
		Mycalesis francisca formosana Fruhstorfer	po	[219]
		Mycalesis sangaica mara Fruhstorfer	po	[219]
		Ypthima esakii Shirôzu	po	[219]
		Ypthima formosana Fruhstorfer	po	[219]
		Ypthima multistriata Butler	po	[219]
Thysanoptera	Phlaeothripidae	*Haplothrips aculeatus* (Fabricius)	po	[66]
			po	[75]
	Thripidae	*Anaphothrips sudanensis* Trybom	po	[75]
		Frankliniella tenuicornis (Uzel)	po	[75]
			po	[165]
		Phibalothrips peringueyi (Faure)	po	[165]

[I]Recorded as *Eysarcoris guttiger* Thunberg
[II]Recorded as *Leucania separata* Walker
[III]Recorded as *Sidemia depravata* Butler
[IV]Recorded as *Agrotis triangulum* (Hüfnagel)
[V]Recorded as *Proceras venosatum* (Walker)

Spiraea japonica
Japanese spiraea

Introduction
The genus *Spiraea* is comprised of approximately 100 species occurring in the mountainous areas of temperate and subtropical regions of the Northern hemisphere. At least 70 species have been recorded in China[139].

Taxonomy
- **Order:** Rosales
- **Suborder:** Rosineae
- **Family:** Rosaceae
- **Subfamily:** Spiraeoideae
- **Genus:** *Spiraea* L.
- **Section:** Calospira K. Koch
- **Series:** Japonicae Yü
- **Species:** *Spiraea japonica* L. f.

Description
Spiraea japonica is an upright shrub that can grow to 1.5 m in height. The slender branchlets are subcylindrical, glabrous and pubescent when young, giving a spreading appearance. Leaf blade, incised bidentate or dentate margined, is ovate to ovoid elliptic, 2-8 cm long and 1 to 3 cm broad, with an abrupt to shortly acuminate apex and a cuneate base. The upper surface is dark green, glabrous or puberulous along the veins, the underside is lighter in color or glaucous and pubescent along the veins. The petiole, about 1-3 mm long, is also pubescent. In June through July, pubescent flowers, about 4-7 mm in diameter, bloom densely in the erect, compound corymb arising from the apex of the annual shoot. Bracts are lanceolate to linear lanceolate and puberulous on the underside. Calyx is campanulate, pubescent inside and sparely so outside. The pubescent sepals are triangular with an abrupt apex. The petals, much shorter than stamens and pink in color, are ovate to orbicular, and obtuse apically, with a length of 2.5-3.5 mm and a width of 2-3 mm. [139, 199].

Habitat and Distribution
Native to Japan and Korea, *S. japonicaca* is cultivated nationwide throughout China as an ornamental [139].

Related Species
S. japonica is highly variable. There are eight varieties reported in China[139, 199].

1) *S. japonica* L. f. var. *acuta* Yü occurs in mixed forests and grassy slopes in western Yunnan province at elevations of 2500-2700 m.
2) *S. japonica* L. f. var. *acuminata* Franch. occurs in sparsely or densely mixed forests, ravines, riversides and grassy slopes at elevations of 950-4000 m, in Anhui, Gansu, Guangxi, Guizhou, Henan, Hubei, Hunan, Jiangxi, Shaanxi, Yunnan and Zhejiang provinces.

3) *S. japonica* L. f. var. *incisa* Yü occurs in prairie thickets at elevations of 3200-4000 m, in Sichuan and Yunnan provinces.
4) *S. japonica* L. f. var. *ovalifolia* Franch. occurs on rocky slopes, forest edges or ravines at elevations of 2500-3800 m, in Sichuan and Yunan provinces.
5) *S. japonica* L. f. var. *fortunei* (Planchon) Rehd. occurs hilly slopes, croplands, or mixed forests at elevations of 700-3000 m, in Anhui, Guizhou, Hubei, Jiangsu, Jiangxi, Shaanxi, Shandong, Sichuan, Yunnan, and Zhejiang provinces.
6) *S. japonica* L. f. var. *glabra* (Regel) Koidz. occurs on rocky land, forests, or forest edges at elevations of 1600-1900m, in Anhui, Sichuan, Yunnan and Zhejiang provinces.
7) *S. japonica* var. *pinnatifida* T. T. Yu & L. T. Lu occurs on slopes in mixed forests; at elevations of about 2900 m in Xizang province.

Natural Enemies of *Spiraea*
Seven fungal species and twenty-seven arthropods have been recorded from members of the genus *Spiraea*. Few natural enemies are recorded for *S. japonica.*

Species of *Spiraea* in China

Scientific Name	Scientific Name
S. alpina Pall.	*S. miyabei* Koidz.
S. anomala Bata.*	*S. mollifolia* Rehd.
S. aquilegiifolia Pallas	*S. mongolica* Maxim.
S. arcuata Hook.	*S. morrisonicola* Hayata
S. bella Sims	*S. muliensis* T. T. Yu & L. T. Lu*
S. blumei	*S. myrtilloides* Rehd.
S. calcicola W. W. Smith	*S. ningshiaensis* T. T. Yu & L. T. Lu*
S. canescens D. Don	*S. nishimurae* Kitag.
S. cantoniensis Lour.	*S. ovalis* Rehd.
S. cavaleriei H. Lév.*	*S. papillosa* Rehd.
S. chamaedryfolia L.	*S. prostrata* Maxim.
S. chinensis Maxim.	*S. prunifolia* Sieb. & Zucc.
S. compsophylla Hand.-Mazz.	*S. pubescens* Turcz.
S. dahurica Maxim.	*S. purpurea* Hand.-Mazz.
S. daochengensis L. T. Lu*	*S. rosthornii* Pritz.
S. dasyantha Bge.	*S. salicifolia* L.
S. elegans Pojark.	*S. sargentiana* Rehd.
S. flexuosa Fisch. ex Cambess.	*S. schneideriana* Rehd.
S. formosana Hayata	*S. schochiana* Rehd.
S. fritschiana Schneid.	*S. sericea* Turcz.
S. hailarensis Liou	*S. siccanea* (W. W. Smith) Rehd.
S. hayatana H. L. Li*	*S. sublobata* Hand.-Mazz.
S. henryi Hemsl.	*S. tarokoensis* Hayata
S. hingshanensis T. T. Yu & L. T. Lu*	*S. teniana*
S. hirsuta (Hemsl.) Schneid.	*S. teretiuscula* C. K. Schneider*
S. hypericifolia L.	*S. thunbergii* Sieb. ex Blume
***S. japonica* L. f.**	*S. trichocarpa* Nakai
S. kwangsiensis Yü	*S. trilobata* L.
S. kweichowensis T. T. Yu & L. T. Lu*	*S. uratensis* Franch.
S. laeta Rehd.	*S. vanhouttei* (Briot) Zabel
S. lichiangensis W. W. Smith	*S. veitchii* Hemsl.
S. lobulata T. T. Yu & L. T. Lu*	*S. velutina* Franch.
S. longigemmis Maxim.	*S. wilsonii* Duthie
S. martinii Lévl.	*S. Tibetensis* L. T. Lu*
S. media Schmidt	*S. yunnanensis* Franch.

* Not listed in *FRPS*[199]

Fungi

Phylum	Family	Species	H. R.	Ref
Ascomycota	Erysiphaceae	*Podosphaera clandestina* var. *clandestina* (Wallr.) Lév.	oo	[24]
			o	[24]I
			po	[26]II
Anamorphic *Botryosphaeria*		*Diplodia spiraeae* Thüm.	mo	[26]

Phylum	Family	Species	H. R.	Ref
Anamorphic *Leptosphaeria*		*Coniothyrium spiraeae* Miyake	mo	[26]
Anamorphic *Mycosphaerella*		*Cercospora spiraeae* Thüm.	m	[26]
		Cladosporium herbarum (Pers.) Link	po	[210]
		Cladosporium nodulosum Corda	mo	[26]
			mo	[210]
		Pseudocercospora spiraeicola (A.S. Mull. & Chupp) X.J. Liu & Y.L. Guo	po	[129]

[I]Recorded as *Podosphaera minor* Hacke
[II]Recorded as *Podosphora oxyacanthae* (DC.) de Bary

Arthropods

Order	Family	Species	H. R.	Ref.
Acariformes	Eriophyidae	*Epitrimerus spiraeae* Kuang	mo	[90]
Coleoptera	Cerambycidae	*Xylotrechus robusticollis* (Pic)	po	[150]
	Chrysomelidae	*Stenoluperus flavipes* Chen	po	[165]
Hemiptera	Acanthosomatidae	*Elasmucha dorsalis* (Jakovlev)	po	[208]
	Pentatomidae	*Sepontia variolosa* (Walker)	mo	[207]
			po	[75]
Homoptera	Aphididae	*Aphis citricola* van der Goot	p	[205]
			po	[165]
	Psyllidae	*Cyamophila* sp.	m	[160]
Lepidoptera	Gelechiidae	*Compsolechia metagramma* Meyrick	mo	[78]
	Hespiriidae	*Pyrgus darwazicus* Kauffmann	mo	[25]
	Lycaenidae	*Acytolepis puspa myla* (Fruhstorfer)	po	[219]
	Noctuidae	*Orthosia gracilis* (Denis & Schiffermüller)	po	[15]
	Nymphalidae	*Brenthis ino* (Rottemburg)	po	[219]
		Limenitis sydyi Lederer	oo	[178]
		Neptis pryeri Butler	oo	[178]
		Neptis pryeri jucundita Fruhstorfer	oo	[219]
	Saturniidae	*Neoris haraldi* Schawerda	po	[226]
	Tortricidae	*Acleris latifasciana* (Haworth)	po	[133]
			po	[78]
		Acleris shepherdana (Stephens)	po	[133]
		Clepsis pallidana (Fabricius)	po	[133]
		Epinotia contrariana (Christoph)	po	[133]
		Olethreutes siderana (Treitschke)	po	[133]
		Pandemis dumetana Treitschke	po	[78]
			po	[166]
		Pandemis heparana (Denis & Schiffermüller)	po	[133]

Order	Family	Species	H. R.	Ref.
Thysanoptera	Aeolothripidae	*Aeolothrips melaleucus* (Haliday)	po	[66]
	Phlaeothripidae	*Haplothrips chinensis* Priesner	po	[75]
			po	[165]
	Thripidae	*Frankliniella intonsa* (Trybom)	po	[66]
		Thrips flavidulus Bagnall	po	[66]

*Recorded as *Clepsis (Siclobola) strigana* (Hübner)

Stellaria media

Common chickweed

Introduction

The genus *Stellaria* contains approximately 190 species, occurring primarily in the temperate regions. Sixty-four species have been reported in China[12].

Taxonomy

Order: Centrospermae
Suborder: Caryophyllineae
Family: Caryophyllaceae
Subfamily: Alsinoideae Vierh.
Tribe: Alsineae Pax
Subtribe: Stellarinae Aschers. et Graebn.
Genus: *Stellaria* L.
Section: Stellaria
Subsection: Stellaria
Series: Petiolares Fenal
Species: *Stellaria media* (L.) Cyr.

Description

Stellaria media is an annual or biennual herb that can reach 10-30 cm in height. The stem is light purplish red with one or two rows of hairs on the surface, and procumbent or erect branches at the base. Leaves are broad ovate or ovate, margin entire, 1.5-2.5 cm long and 1-1.5 cm wide, with acuminate or abrupt apex and attenuate or subcordate base, lower leaf is petioled. The inflorescence is a terminal cyme. The sepals are, ovate lanceolate, about 4 mm in length, slightly obtuse or suborbicular apically and covered with short glandular hairs outside. Shorter than sepals, each petal is white, oblong, nearly bisected. Shorter than petals, stamens are 3-5 with 3 linear styles. Slightly longer than the persistent calyx, capsules are ovate, 6-lobed apically. The flowers bloom from June to July and followed by fruits in July through August. The plentiful seeds are reddish brown, ovate to suborbicular, nearly compressed, 1-1.2 mm in diameter[12, 187].

Habitat

Stellaria media most often occurs in moist croplands, along roadsides, or in grasslands near streams[39].

Distribution

Stellaria media occurs in Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Inner Mongolia, Ningxia, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Xizang, Yunnan, and Zhejiang provinces[12, 187].

Economic Importance

Although the stems, leaves and seeds of *S.media* are reported to be medically useful and edible, *S. media* is a bothersome weed during the early through middle stage of crop growth of wheat, rape and some vegetables. It is also poisonous to poultry[39, 108, 187].

Related Species

S. media var. *micrantha* (Hayata) T. S. Liu & S. S. Ying, native to Taiwan, is a perennial herb. Its petals are nearly equal to sepals, which are 2-2.5 mm long, whereas *S. media* var. *media* has longer sepals and shorter petals [12]. *S. media* and five additional members of the genus *Stellaria* are regarded as unwelcome plants in China. They are *S. alsine* Grimm, *S. pallida* (Dumortier) Crépin, *S. dichotoma* L., *S. discolor* Turcz., and *S. neglecta* Weihe ex Bluff et Fingerh[108].

Natural Enemies of *Stellaria*

Eleven fungi and eighteen arthropods have been found on the members of the genus *Stellaria*. Four fungal species are reported to infect *S. media*. One out of seven insects that attack *S. media*, *Hypera basalis* (Voss) is considered to be a potential biological control agent[116].

Species of *Stellaria* in China[12, 187]

Scientific Name	Scientific Name
S. alaschanica Y. Z. Zhao	***S. media* (L.) Cyr.**
S. alsine Grimm[I]	*S. monosperma* Buch.-Ham. ex D. Don
S. amblyosepala Schrenk	*S. neglecta* Weihe ex Bluff et Fingerh.
S. arenarioides Shi L. Chen et al.[II]	*S. nemorum* L.
S. arisanensis (Hayata) Hayata	*S. nepalensis* Majumdar et Vartak
S. bistyla Y. Z. Zhao†	*S. nipponica* Ohwi
S. brachypetala Bge.	*S. omeiensis* C. Y. Wu et Y. W. Tsui ex P. Ke
S. bungeana Fenzl	*S. ovatifolia* (Mizushima) Mizushima
S. cherleriae (Fisch. ex Ser.) Williams	*S. oxycoccoides* Kom.
S. chinensis Regel	*S. pallida* (Dumortier) Crépin[III]
S. congestiflora Hara	*S. palustris* Ehrh. ex Retz.
S. crassifolia Ehrh.	*S. parviumbellata* Y. Z. Zhao
S. decumbens Edgew.	*S. patens* D. Don
S. delavayi Franch.	*S. petiolaris* Hand.-Mazz.
S. depressa E. Schmid	*S. petraea* Bge.
S. dianthifolia Williams	*S. pilosoides* Shi L. Chen et al.[IV]
S. dichotoma L.	*S. pusilla* E. Schmid
S. discolor Turcz.	*S. radians* L.
S. ebracteata Kom.	*S. reticulivena* Hayata
S. filicaulis Makino	*S. salicifolia* Y. W. Tsui ex P. Ke
S. graminea L.	*S. soongorica* Roshev.
S. gyangtseensis Williams	*S. souliei* Williams
S. gyirongensis L. H. Zhou	*S. strongylosepala* Handel-Mazzetti†
S. henryi Williams	*S. subumbellata* Edgew.
S. imbricata Bge.	*S. Tibetica* Kurz
S. infracta Maxim.	*S. uda* Williams
S. irrigua Bge.	*S. umbellata* Turcz.
S. lanata Hook. f. ex Edgew. et Hook. f.	*S. vestita* Kurz
S. lanipes C. Y. Wu et H. Chuang	*S. winkleri* (Briq.) Schischk.
S. longifolia Muehl. ex Willd.	*S. wushanensis* Williams
S. mainlingensis L. H. Zhou	*S. yunnanensis* Franch.
S. martjanovii Krylov	*S. zangnanensis* L. H. Zhou

† Not listed in *FRPS*
[I] Recorded as *S. uliginosa* Murr. in *FRPS*
[II] Recorded as *S. arenaria* Maxim. in *FRPS*
[III] Recorded as *S. apetala* Ucria ex Roem. in *FRPS*
[IV] Recorded as *S. pilosa* Franch. in *FRPS*

Fungi

Phylum	Family	Species	H. R.	Ref.
Ascomycota	Sclerotiniaceae	*Sclerotinia sclerotiorum* (Lib.) de Bary	p	[26]
Basidiomycota	Pucciniaceae	*Puccinia arenariae* (Schumach.) J. Schröt.	po	[26]
			p	[229]
		Puccinia stellariicola Cummins	oo	[26]
		Uromyces inaequalis Lasch ex Rabenh.	po	[26]

Phylum	Family	Species	H. R.	Ref.
		Uromyces leptaleus Syd.	oo	[26]
Oomycota	Peronosporaceae	*Peronospora alsinearum* Casp.	m	[26]
			o	[202]
		Peronospora media Gäum.	m	[26]
		Peronospora parva Gäum.	oo	[202]
		Peronospora stellariae-radiantis Sawada	oo	[202]
		Peronospora stellariae-uliginosae Sawada	mo	[26]
			oo	[202]
Anamorphic *Mycosphaerella*		*Septoria paraphysoides* Speg.	oo	[26]

Arthropods

Order	Faimly	Species	H. R.	Ref.
Acariformes	Tetranychidae	*Tetranychus cinnabarinus* (Boisduval)	po	[167]
Coleoptera	Curculionidae	*Hypera basalis* (Voss)	m	[116]
Hymenoptera	Tenthredinidae	*Rhogogaster viridis* (L.)	po	[166]
Lepidoptera	Geometridae	*Euphyia cineraria* (Butler)	m	[195]
			m	[189]
		Euphyia unangulata (Haworth)	m	[195]
		Euphyia unangulata gracilaria (Bang-Haas)	m	[189]
		Sterrha rufaria Hübner	m	[25]
	Noctuidae	*Agrotis exclamationis* (L.)	po	[166]
		Amathes triangulum Hüfnagel	po	[166]
		Apamea characteria (Denis & Schiffermüller)	po	[15]I
		Axylia putris (L.)	po	[228]II
			po	[178]
			po	[11]
			po	[181]II
		Euxoa tritici (L.)	p	[25]
		Hoplodrina alsines (Brahm)	po	[15]III
			po	[166]III
		Hoplodrina blanda (Denis & Schiffermüller)	po	[15]IV
		Lacanobia w-latinum (Hüfnagel)	po	[25]V
		Polia illoba (Butler)	p	[228]
		Xestia c-nigrum (L.)	p	[166]VI
		Xestia triangulum (Hüfnagel)	po	[178]VII
			po	[224]VII
			po	[11]VII
			po	[181]VII

[I]Recorded as *Apamea hepatica* (L.)
[II]Recorded as *Agrotis putris* (L.)
[III]Recorded as *Athetis alsines* (Brahm)
[IV]Recorded as *Athetis blanda* (Schiffermüller)
[V]Recorded as *Recorded as Polia w-latinum* Hüfnagel
[VI]Recorded as *Amathes c-nigrum* L.
[VII]Recorded as *Agrotis triangulum* (Hüfnagel)

Tamarix species
Salt Cedar, Tamarisk

Introduction
The genus *Tamarix* contains approximately 90 species worldwide, primarily in Asia and North Africa, as well as the arid and semi-arid areas of Europe. Distribution ranges from 10°W to 145°E, and 50°through 20°N in the Northern hemisphere, and 55°through 12°S in the Southern hemisphere. Members of the genus are tolerant to dry, saline, hot conditions, with a preference for sand and water[206].

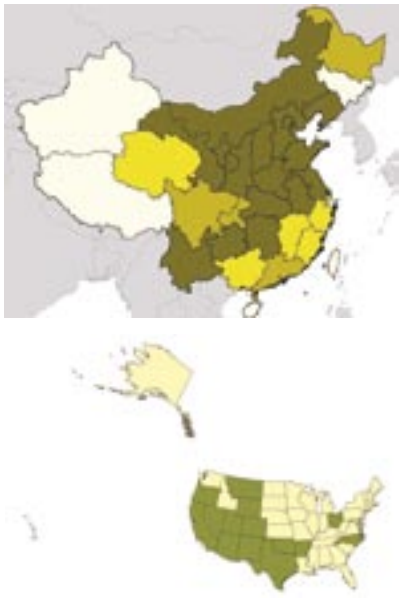
Species of *Tamarix* in China[206]

Scientific Name	Scientific Name
T. tenuissima Nakai	*T. hohenackeri* Bunge
T. androssowii Litw.	*T. jintaenia* P. Y. Zhang et M. T. Liu
T. aphylla (L.) Karst.	*T. karelinii* Bunge
T. arceuthoides Bunge	*T. laxa* Willd.
T. austromongolica Nakai	*T. leptostachys* Bunge
***T. chinensis* Lour.**	*T. mongolica* Niedenzu
T. elongata Ledeb.	***T. ramosissima* Ledeb.**
T. gansuensis H. Z. Zhang	*T. sachuensls* P. Y. Zhang et M. T. Liu
T. gracilis Willd.	*T. taklamakanensis* M. T. Liu
T. hispida Willd.	*T. tarimensis* P. Y. Zhang et M. T. Liu

I. *Tamarix chinensis*
Five stamen Tamarisk, Salt Cedar

Taxonomy
Order: Violales
Suborder: Tamaricineae
Family: Tamaricaceae
Genus: *Tamarix* L.
Species: *Tamarix chinensis* Lour.

Description
Tamarix chinensis is a deciduous shrub or small tree 3-6 m tall. The branches are purplish red, dark red or light brown; and thin, slender and weeping when young. The leaves are subulate or ovate lanceolate, 1-3 mm long, and scale-like on the underside. The inflorescence is a panicle at the end of the shoot. Flower stalks are slender. Bracts are oblong, or linear chisel shaped, and inflated at the base. The sepals are 5-numbered, narrowly ovate, and shorter than purplish petals, which are also 5-numbered, and persistent when fruited. The floral disc is purplish, and has 5 or 10 lobes, between which stamens occur in 5s and are longer than the petals. The ovary is cylindrical with 3 rod-shaped styles. The fruit is a capsule about 3.5 mm in length. The flowers appear in April followed by fruits in late summer through October[206].



Habitat
T. chinensis occurs in alluvial plains, seashores, flood plains, and other moist and saline areas[206]. Additional habitats include streamsides and roadsides at elevations of 1910-2500 m in Yunnan province, southwestern China[14], valleys, and hillside slopes at elevations of 900 m in Shanxi province, northern China[47], at 500 m in the Shenlongjia Mountain area, and Hubei province of central China[54].

Distribution
T. chinensis is native to Anhui, Hebei, Henan, Jiangsu, Liaoning, and Shandong provinces. It is planted in areas of eastern and southwestern China[206] extending to Guangdong, Guangxi and Yunnan[85]. Recently published provincial floras indicate that *T. chinensis* may also occur in Gansu, Hubei[54], Hunan[151], Inner Mongolia[144], Ningxia[142], Shanxi[47], Yunnan[14], cultivated in Fujian[41], Guangxi[63], Jiangxi[42], Qinghai[127], Shaanxi[82], Zhejiang[153], and probably Guangdong[85], Heilongjiang[157], and Sichuan[85].

Economic Importance
T. chinensis, is cultivated for soil stabilization and as an ornamental. The young shoots, leaves, and flowers are used medicinally[14].

II. *Tamarix ramosissima*

Taxonomy
Order Violales
Suborder Tamaricineae
Family Tamaricaceae
Genus *Tamarix* L.
Species *Tamarix ramosissima* Ledeb.

Description

Tamarix ramosissima is a shrub or small tree 1-3 m tall. The stems and older bark are dark gray. The annual lignified vegetable shoots are erect, slender, multi-stemmed, light red or orange yellow color, which fades on the biennial shoot. Leaves on the lignified shoot are lanceolate, and half perfoliate, while the leaves of the green vegetative shoots are subovate, or triangular-cordate, 2-5 mm long, acuminate at the apex, and nearly perfoliate. The raceme inflorescence, 3-3.5 cm long and 3-5 mm wide, appears at the apex of the annual shoot in a panicle arrangement 0.2-1 cm in length. The bract is lanceolate, 1.5-2 mm long, and equal to or longer than the calyx, petals are pink to purple, obovate to broadly so, and persistent when in fruit. The sepals are broadly elliptic, or ovate, 0.5-1 mm long. Flowers are 5-numbered. The floral disc is five-lobed, equal to or 2.5 times the length of the corolla. The fruit is a conical capsule, 3-4 times longer than calyx. The flowers and fruits appear from May through September[47].

Habitat

T. ramosissima occurs on hillside slopes, along stream banks and stream beds at elevations of 770-1470 m in Shanxi[47], 2700-2950 m in Qinghai[127], salt marshes, floodplains, sandy areas in Shandong [9], wetland and swamp interface in Ningxia[142], dry riverbeds in Inner Mongolia[144].

Distribution

T. ramosissima occurs in the provinces of Gansu, Inner Mongolia, Ningxia, northern Shandong, Shanxi, Qinghai, Xinjiang,[9, 47, 206], and probably Beijing and western Tibet[18, 67, 186, 206].

Economic Importance

T. ramosissima is cultivated in arid areas for soil stabilization and reforestation. It is sometimes planted as an ornamental and as sheep and cattle forage. However, it is regarded as a weed when it appears in crop fields and irrigation areas[206].

Natural Enemies of *Tamarix*

At least two fungal species and eight arthropods have been recorded as associated with *Tamarix*. *Alternaria tamaricis* T. Y. Zhang, *Liocleonus clathratus* (Olivier), *Cryptocephalus astracanicus* Suffrian, and *Stylosomus tamaricis* Herrich-Schäffer are recorded hosted by *T. Chinensis*. Meng et al reported 105 species in 29 families of 7 orders resulted from the surveys on *Tamarix* sepecies in Xinjiang[146]. *Diorhabda elongata deserticola* Chen, a leaf beetle specific to *tamarix* spp, was already imported and released in the western United States[27].

Fungi

Phylum	Family	Species	H. R.	Ref.
Basidiomycota	Incertae sedis	*Inonotus rheades* (Pers.) Bondartsev & Singer	po	[26]
Anamorphic *Lewia*		*Alternaria tamaricis* T. Y. Zhang	m	[209]

Arthropods

Order	Family	Species	H. R.	Ref
Coleoptera	Chrysomelidae	*Diorhabda elongata deserticola* Chen	oo	[173]†
	Curculionidae	*Liocleonus clathratus* (Olivier)	m	[6]
	Eumolpidae	*Cryptocephalus astracanicus* Suffrian	m	[164]
		Stylosomus tamaricis Herrich-Schäffer	m	[164]
Hemiptera	Pentatomidae	*Desertomenida quadrimaculata* (Horvath)	oo	[208]
Homoptera	Coccidae	*Ceroplastes rubens* Maskell	po	[173]
Lepidoptera	Lymantriidae	*Teia ericae* Germar	po	[212]‡
			po	[213]
	Pyralidae	*Cryptoblabes gnidiella* (Millière)	po	[169]

†Recorded as *Diorhabda deserticola* Chen
‡Recorded as *Orgyia ericae* Gremer

Taxus cuspidata
Japanese yew

Introduction
The genus *Taxus* contains 9 species occuring primarily in the Northern hemisphere. Three of these species occur in China[50].

Taxonomy
Order: Taxales
Family: Taxaceae
Tribe: Taxeae Milchior et Werd.
Genus: *Taxus* L.
Species: *Taxus cuspidata* Sieb. et Zucc.

Description
Taxus cuspidata is tree approximately 20 m in height and 1 m in diameter. The bark is reddish brown with shallow cracks on the surface. Branches are dense, in a spreading or ascending growth form. Bud scales persist in the branchlets. Annual branchlets are green, turning reddish brown in the fall. The biennial and triennial brachlets are reddish brown or yellowish brown. The scales of the yellowish brown winter buds are acuminate in the apex and longitudinally ridged on the back. Leaves grow irregularly in two rows about 45 degrees to each other along the stems. The leaves are linear, straight or slightly falcate, 1-2.5 (occasionally 4) cm long and 2.5-3 mm wide, with a narrow base, mucronate apex and short petiole. The upper surface of the leaf is dark green, and shiny, while the underside has two rows of grayish green becoming yellowish brown stomata, which are two-third the width of the leaf. Each male cone has 9-14 microsporophylls (stamens), with 5-8 anthers each. Seeds are purplish red, shiny, ovoid, about 6 mm long, with 3-4 obtuse ridges near the top. Flowers appear from May to June, and seeds ripen in September through October[215].

Species of *Taxus* in China

Scientific Name	Scientific Name
T. cuspidata Sieb. et Zucc.	*T. wallichiana* Zucc.‡
T. fauna Nan Li et R. R. Mill†	

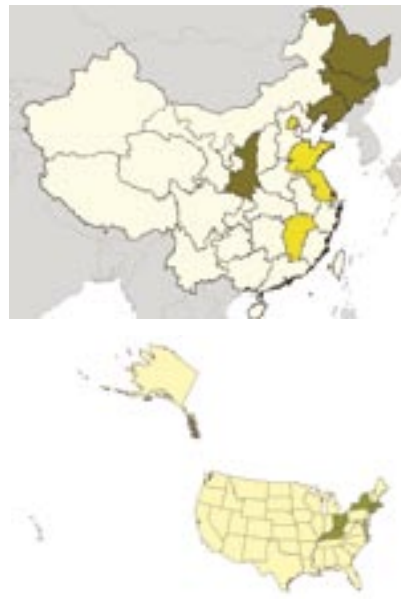
† Recorded in *FRPS* as *T. wallichiana* Zucc.
‡*Taxus wallichiana* var. *chinensis* (Pilger) Florin is recorded in *FRPS* as *T. chinensis* (Pilger) Rehd.; *T. wallichiana* var. *wallichiana* is recorded in *FRPS* as *T. yunnanensis* Cheng et L. K. Fu.

Habitat
T. cuspidata occurs on acidic soils in cold, humid habitats, at elevations of 500–1000 m[50, 215].

Distribution
T. cuspidata occurs in Heilongjiang, eastern Jilin, Liaoning, and Shaanx provincesi[50]. It is also reportedly cultivated in Beijing, and Jiangsu, Jiangxi, Shandong, and Shanghai provinces[67, 215].

Economic Importance
The wood of *T. cuspidata* is used in construction and furniture making. It is also the source of a red dye. The seed is used as an oil source and other parts of the plant contain chemical compounds used in medicine[215].

Natural Enemies of *Taxus*
Only one species of fungi has been recorded from *T. cuspidata*[215].



Fungi

Phylum	Family	Species	H. R.	Ref.
Anamorphic Botryosphaeria		*Macrophoma taxi* (Berk.) Berl. & Voglino	m	[26]

Tribulus terrestris
Puncture vine

Introduction
The genus *Tribulus* contains 20 species worldwide, primarily occurring in tropical and subtropical regions. In China, only 2 species have been recorded[132].

Species of *Tribulus* in China

Scientific Name
T. terrestris L.*
T. cistoides L.

*Recorded as *T. terrester* L. in *FRPS*

Taxonomy
Order: Geraniales
Suborder: Geraniineae
Family: Zygophyllaceae
Genus: *Tribulus* L.
Species: *Tribulus terrestris* L. (=*Tribulus terrester* L.)

Description
Tribulus terrestris is an herbaceous annual, with glabrous, villous or hirsute, procumbent stems that are 20-60 cm in length. Leaves are parapinnately compound 1.5-5 cm long with 3-8 pairs of opposite leaflets for each. Each leaf is oblong or asymmetrical, 5-10 mm long and 2-5 mm wide, acute or obtuse apically, slightly asymmetrical basally, and an entire margin. Axillary yellow flowers have a pedicel shorter than the leaf. Both petals and persistent calyxes are 5-numbered. Ten stamens occur at the base of the floral disc which also bears scale-like glands. The ovary has 5 ridges, and a 5-lobed stigma, with 3-4 ovules in each loculus. Flowers appear from May through August, and fruit July through September. Fruits are stiff, glabrous or hairy, 4-6 mm long, with 2 spines in the middle of fruit margin. The fruits is a 5 part mericarp[132].

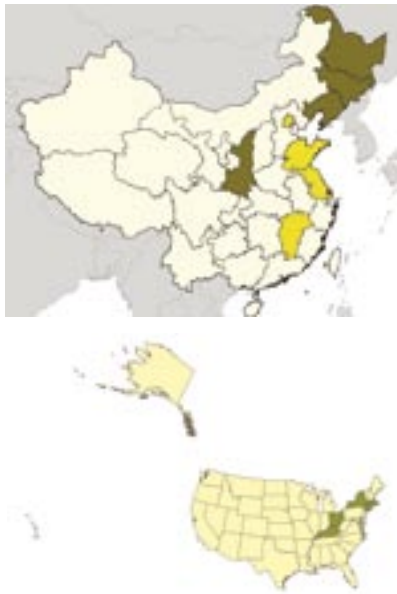
Habitat
Tribulus terrestris occurs in sandy areas, waste land, hillside slopes, as well as residential areas[132].

Distribution
Tribulus terrestris has a nationwide distribution in China[132].

Economic Importance
Tribulus terrestris can be used as forage while green. Fruits are medically useful. It is a common pest plant in the pasture[132] and causes damage to cotton, pulse, root and tuber crops and other crops and vegetables[39].

Related Species
Tribulus cistoides has a pedicel nearly equal to the leaf in length and a larger flower with a diameter of about 3 cm, whereas *T. terrestris* is 1 cm in diameter. *T. cistoides* occurs along coastal beaches and sparse forests in Hainan, and the hot, dry valleys in Yunnan[132].

Natural Enemies of *Tribulus*
One species of fungi and one arthropod have been found to be associated with *Tribulus terrestris*.



Fungi

Phylum	Family	Species	H. R.	Ref.
Oomycota	Peronosporaceae	*Peronospora tribulina* Pass.	m	[202]

Arthropods

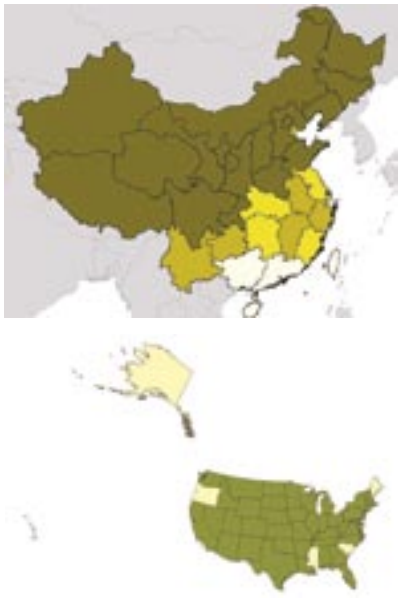
Order	Family	Species	H. R.	Ref
Acariformes	Tetranychidae	*Tetranychus truncatus* Ehara	p	[106]

Ulmus pumila
Siberian elm

Introduction
The genus *Ulmus* contains approximately 30 species in North America, Asia and Europe. More than 20 of these species occur nationwide in China, although most species occur north of the Yangtze River. Because of their high economic value, many *Ulmus* species are cultivated outside of their native range[49, 51]

Taxonomy
Order: Urticales
Family: Ulmaceae
Genus: *Ulmus* L.
Section: Ulmus
Series: Glabrae Moss.
Species: *Ulmus pumila* L.

Description
Ulmus pumila is a deciduous tree that can reach 25 m in height and 1 m in diameter. In arid areas *U. pumila* grows as a shrub. The shoots have smooth bark, which is grayish brown or light grayish, but will become coarse, dark grayish and spilt irregularly with age. The twigs are light yellowish gray, light grayish brown or light gray, glabrous or pubescent, with scattered lenticels. Winter buds are ovoid to globose. The surface scales are glabrous, whereas those inside the buds are white and ciliated along the margins. The leaves are elliptically ovate to elliptically lanceolate, or ovoid lanceolate, 2-8 cm long and 1.2-3.5 cm wide, with an acuminate apex and asymmetrical base with dentate or bidentate margins. The upper leaf surface is glabrous, while the lower side is glabrescent with hairy vein axils. Emerging earlier than the leaves, fascicled cymes appear in the leaf axil of the second year branchlets. Fruits are suborbicular samaras about 1.2-2 cm long, glabrous except for the stigmatic surface which is pubescent. The persistent perianth is glabrous and 4-lobed with a ciliated margin. In general, the flowers and fruits appear from March to June, somewhat later in northeastern China[49].



Habitat
U. pumila occurs on hillside slopes, in valleys, plains, and dunes at elevations of 1000 to 2500 m[49, 51].

Distribution
U. pumila occurs primarily in north, northwest, northeast China, and some southwestern provinces[49] In fact, the appearance of the tree in areas south of the Yangtze River is due to cultivation.[83] *U. pumila* occurs in Gansu, Hebei, Henan, Heilongjiang, Jilin, Liaoning, Inner Mongolia, Ningxia, eastern Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Xinjiang, and Xizang provinces[51]. According to provincial floras and other publications, *U. pumila* may occur, in Guizhou and Yunnan provinces. It may occur in Guizhou and Yunnan, two southwestern provinces according to provincial floras and other publications[111, 183]. *U. pumila* is commonly cultivated in the provinces situated at the lower reach of the Yangtze River and it is easily found in the countryside of the northern Anhui and Huabei plains[49].

Economic Importance
U. pumila yields high quality wood. It is often used in reforestation. The bark can be used as a fiber source instead of hemp. The finely ground bark can be used to produce a type of vinegar. The leaves can be used as forage. The samaras are edible and are also used in the pharmaceutical and chemical industries[49, 51].

Natural Enemies of *Ulmus*
Twenty nine species of fungi and 284 arthropods are reported to be associated with members of the genus *Ulmus*. Chinese elm, the common name for *U. pumila*, generally refers to various species of *Ulmus*, therefore natural enemies coded "m" may attack other *Ulmus* species as well as *U. pumila*.

Species of *Ulmus* in China

Scientific Name	Scientific Name
U. americana L.†	*U. laciniata* (Trautv.) Mayr
U. androssowii Litw. var. *subhirsuta* (Schneid.) P. H. Huang, F. Y. Gao et. L H Zhuo	*U. laevis* Pall.†
U. bergmanniana Schneid.	*U. lamellosa* T. Wang et S. L. Chang ex L. K. Fu
U. castaneifolia Hemsl.	*U. lanceifolia* Roxb. ex Wallich‡
U. changii Cheng	*U. macrocarpa* Hance
U. chenmoui Cheng	*U. microcarpa* L. K. Fu
U. davidiana Planch.	*U. parvifolia* Jacq.
U. densa Litw.†	*U. prunifolia* Cheng et L. K. Fu
U. elongata L. K. Fu et C. S. Ding	*U. pseudopropinqua* Wang et Li
U. gaussenii Cheng	***U. pumila* L.**
U. glaucescens Franch.	*U. szechuanica* Fang
U. harbinensis S. Q. Nie et K. Q. Huang	*U. uyematsui* Hayata

†Non-native species grown as cultivated plants in China.[51]

‡Recorded as *U. lanceaefolia* Roxb. in *FRPS*, also the current name of *U. tonkinensis* Gagnep. [49, 51]

Fungi

Phylum	Family	Species	H. R.	Ref.
Ascomycota	Erysiphaceae	Phyllactinia pteroceltidis Y.N. Yu & S.J. Han	p	[24]
		Podosphaera clandestina var. clandestina (Wallr.) Lév.	o	[24]I
			p	[26]I
		Uncinula clandestina var. clandestina	o	[24]
		Uncinula clandestina var. ulmi-foliaceae Biv.	oo	[24]
		Uncinula kenjiana Homma	oo	[24]
			p	[26]
	Mycosphaerellaceae	Mycosphaerella ulmi Kleb.	o	[26]II
	Nectriaceae	Nectria cinnabarina (Tode) Fr.	p	[26]III
	Rhytismataceae	Melasmia ulmicola Berk. & M.A. Curtis	o	[26]
	Valsaceae	Gnomonia oharana Y. Nisik. & H. Matsumoto	p	[26]
		Gnomonia ulmea (Schwein.) Thüm.	o	[26]
		Rehmiella ulmicola Miyake	mo	[26]
		Stegophora aemula Syd.	mo	[26]
	Venturiaceae	Platychora ulmi (Schleich.) Petr.	mo	[26]IV
Basidiomycota	Hymenochaetaceae	Xanthochrous hispidus (Bull.) Pat.	po	[26]
	Polyporaceae	Coriolus unicolor (Bull.) Pat.	po	[26]
		Favolus squamosus (Huds.) Ames	o	[26]
		Fomes fomentarius (L.) J.J. Kickx	p	[26]
		Trametes hirsuta (Wulfen) Pilát	po	[26]V
		Tyromyces galactinus (Berk.) Bondartsev	po	[26]
	Sistotremataceae	Fibuloporia donkii Domański	po	[26]VI
	Tricholomataceae	Lyophyllum ulmarium (Bull.) Kühner	oo	[26]VII
	Typhulaceae	Apiosporium salicinum (Pers.) Kunze	p	[26]
Anamorphic Guignardia		Phyllosticta bellunensis Martelli	po	[26]
Anamorphic Guignardia		Phyllosticta ulmicola Sacc.	o	[26]
Anamorphic Lepteutypa		Seiridium intermedium (Sacc.) B. Sutton	mo	[26]VIII
Anamorphic Mycosphaerella		Pseudocercospora sphaeriiformis (Cooke) Y.L. Guo & X.J. Liu	m	[26]IX
Anamorphic Mycosphaerella			oo	[129]
Anamorphic Mycosphaerella		Septoria yokokawai Hara	mo	[26]
Anamorphic Mycosphaerellaceae		Ascochyta ulmi	m	[26]

Phylum	Family	Species	H. R.	Ref.
Anamorphic Pyrenopeziza		Cylindrosporium ulmi (Fr.) Vassiljevsky	m	[26]

[I]Recorded as *Uncinula clandestina* (Biv. -Bern.) Schrot
[II]Recorded as *Septoria ulmi* Hara
[III]Recorded as *Tubercularia vulgaris* Tode
[IV]Recorded as *Systremma ulmi* (Duv. ex Fr.) Theiss. et Syd.
[V]Recorded as *Coriolus hirsutus* (Wulf ex Fr.) Quél
[VI]Recorded as *Poria mucida* (Pers.) Fr.
[VII]Recorded as *Pleurotus ulmarius* (Bull. ex Fr.) Quél
[VIII]Recorded as *Coryneum intermedium* Sacc
[IX]Recorded as *Cerospora sphaeriiformis* Cooke

Arthropods

Order	Family	Species	H. R.	Ref.
Acariformes	Eriophyidae	*Aceria nanjingensis* Kuang	oo	[90]
		Panonychus citri (Mc Gregor)	p	[94]
		Panonychus ulmi (Koch)	p	[94]
	Rhyncaphytoptidae	*Diptacus pseudocerasis* Kuang & Hong	oo	[90]
		Rhinophytoptus xiamenensis Kuang	oo	[90]
		Rhyncaphytoptus ulmi chongqingensis Kuang & Hong	mo	[90]
		Rhyncaphytoptus ulmivagrans (Keifer)	o	[90]
	Tarsoneomidae	*Polyphagotarsonemus latus* (Bank)	p	[94]
	Tetranychidae	*Eotetranychus* sp.	p	[75]
		Eurytetranychus ulmi Wang	o	[167]
Coleoptera	Attelabidae	*Apoderus jekeli* Roelofs	p	[94]
		Byctiscus congener Jekel	p	[94]
		Phymatapoderus latipennis (Jekel)	p	[75]
	Cerambycidae	*Amarysius altajensis* (Laxmann)	po	[13]
		Anoplophora chinensis (Förster)	p	[94]
			p	[178]
			p	[13]
			p	[165]
			p	[75]
		Anoplophora glabripennis (Motschulsky)	p	[13]
			p	[178]
			p	[94]
		Anoplophora horsfieldi (Hope)	m	[75]
			p	[94]
		Anoplophora nobilis Ganglbauer	p	[86]
		Aphrodisium provosti (Fairmaire)	p	[94]
		Apriona germari (Hope)	p	[94]
			p	[13]
			p	[165]
			p	[178]
		Asias halodendri (Pallas)	po	[13]
			p	[94]

Order	Family	Species	H. R.	Ref.
		Batocera horsfieldi (Hope)	p	[94]
			p	[13]
			p	[178]
		Batocera lineolata Chevrolat	p	[75]
			p	[94]
			p	[165]
		Callipogon relictus (Semenov)	p	[13]
		Chelidonium provosti (Fairmaire)	p	[150]
		Chelidonium purpureipes Gressitt	p	[94]
		Clytobius davidis (Fairmaire)	p	[150]
		Dorysthenes hydropicus Pascoe	p	[94]
		Dorysthenes paradoxus Faldermann	p	[94]
		Glenea relicta Pascoe	o	[94]
			mo	[13]
		Megopis sinica White	p	[13]
			p	[94]
		Mesosa longipennis Bates	po	[13]
		Mesosa myops (Dalman)	po	[13]
		Olenecamptus clarus Pascoe	p	[94]
		Oplatocera oberthuri Gahan	m	[86]
			m	[75]
		Philus antennatus (Gyllenhal)	p	[94]
			p	[178]
		Plagionotus pulcher Blessig	p	[13]
		Pogonocherus dimidiatus Blessig	po	[13]
		Prionus heros (Semenov-Tian-Shanskij)	m	[86]
		Prionus insularis Motschulsky	p	[94]
			p	[13]
		Pterolophia rigida (Bates)	p	[13]
		Trichoferus campestris (Faldermann)	p	[94]
		Xylotrechus cuneipennis (Kraatz)	po	[13]
			p	[94]
		Xylotrechus grayii (White)	p	[94]
			p	[13]
		Xylotrechus rusticus (L.)	po	[13]
	Cetoniidae	*Anthracophora rusticola* Burmeister	p	[143]
		Oxycetonia jucunda Faldermann	p	[94]
		Poecilophilides rusticola (Burmeister)	p	[94]
		Protaetia aerata (Erichson)	p	[143]
		Protaetia brevitarsis (Lewis)	p	[94]I
			po	[143]
		Protaetia famelica Janson	p	[165]II

Order	Family	Species	H. R.	Ref.
		Protaetia lugubris orientalis (Medvedev)	p	[165]
		Protaetia nitididorsis (Fairmaire)	p	[143]
			p	[75]
		Torynorrhina fulvopilosa (Moser)	p	[75]III
	Chrysomelidae	*Ambrostoma fortunei* (Baly)	m	[201]
			m	[75]
		Ambrostoma leigongshana Wang	m	[201]
			m	[75]
		Ambrostoma quadriimpressum (Motschulsky)	m	[201]
			po	[94]
		Dercetina flavocincta (Hope)	m	[178]
		Gastrolina peltoidea (Gebler)	p	[94]
		Mimastra cyanura (Hope)	p	[201]
			oo	[165]
			p	[94]
		Mimastra limbata Baly	po	[201]
			p	[94]
		Monolepta yoasanica Chen	p	[94]
		Pallasiola absinthii (Pallas)	p	[201]
		Pyrrhalta aenescens (Fairmaire)	m	[201]
			m	[94]
		Pyrrhalta maculicollis (Motschulsky)	m	[94]
			m	[201]
			m	[75]
	Curculionidae	*Chlorophanus lineolus* Motschulsky	p	[94]
		Chlorophanus sibiricus Gyllenhal	p	[94]
		Eugnathus distinctus Roelofs	m	[94]
		Piazomias globulicollis Faldermann	p	[211]
		Piazomias validus Motschulsky	p	[211]
		Tanymecus urbanus Gyllenhal	p	[211]
	Eumolpidae	*Abirus fortunei* (Baly)	p	[164]
			p	[94]
			p	[75]
		Basilepta leechi (Jacoby)	p	[94]
		Clytra laeviuscula Ratzeburg	p	[164]
			p	[165]
			p	[94]
		Cryptocephalus lemniscatus Suffrian	m	[164]
		Cryptocephalus mannerheimi Gebler	p	[164]
		Cryptocephalus ochroloma Gebler	p	[164]
		Cryptocephalus pilosellus Suffrian	p	[164]
		Cryptocephalus regalis Gebler	p	[94]

Order	Family	Species	H. R.	Ref.
		Cryptocephalus stchukini Faldermann	m	[164]
		Labidostomis bipunctata (Mannerheim)	p	[164]
			p	[94]
		Smaragdina mandzhura (Jacobson)	p	[164]
		Smaragdina semiaurantiaca (Fairmaire)	p	[164]
			m	[94]
	Lucanidae	*Aegus parallelus* Hope & Westwood	p	[94]
		Lucanus fortunei Saunders	p	[178]
		Proagopertha lucidula Faldermann	p	[94]
		Prosopocoilus blanchardi Parry	p	[94]
			p	[75]
	Melolonthidae	*Apogonia chinensis* Moser	p	[94]
		Heptophylla picea Motschulsky	p	[94]
		Holotrichia convexopyga Moser	p	[94]
		Holotrichia diomphalia Moser	p	[94]
		Holotrichia lata Brenske	p	[94]
		Holotrichia morosa Waterhouse	p	[94]
		Holotrichia parallela Motschulsky	p	[94]
		Holotrichia trichophora (Fairmaire)	p	[94]
		Maladera castanea (Arrow)	p	[94]
		Maladera orientalis (Motschulsky)	p	[94]
	Nitidulidae	*Librodor japonicus* (Motschulsky)	m	[94]
	Rhynchophoridae	*Hyposipalus gigas* Fabricius	p	[94]
	Rutelidae	*Anomala corpulenta* Motschulsky	p	[94]
		Popillia atrocoerulea Bates	p	[94]
		Popillia quadriguttata (Fabricius)	p	[94]
	Scolytidae	*Scolytus aratus* Blandford	po	[197]
		Scolytus butovitschi Stark	m	[197]
		Scolytus confusus Eggers	m	[197]
		Scolytus esuriens Blandford	oo	[197]
		Scolytus jacobsoni Spessivtseff	mo	[197]
		Scolytus parviclaviger Yin & Huang	mo	[197]
		Scolytus schevyrewi Semenov	p	[197]
		Scolytus semenovi Spessivtseff	o	[197]
		Scolytus seulensis Murayama	p	[165]
		Scolytus shikisani Niisima	m	[197]
		Scolytus squamosus Yin & Huang	mo	[197]
		Sphaerotrypes ulmi Tsai & Yin	m	[197]
		Trypodendron signatum Fabricius	po	[165]
		Xyleborus emarginatus Eichhoff	p	[94]
		Xyleterus proximus Niisima	po	[197]
	Trichiidae	*Trichius fasciatus* (L.)	p	[143]

Order	Family	Species	H. R.	Ref.
Hemiptera	Acanthosomatidae	*Dichobothrium nubilum* (Dallas)	p	[207]
			m	[94]
		Elasmostethus humeralis Jakovlev	p	[207]
			po	[94]
		Elasmucha ferrugata (Fabricius)	p	[208]
	Lygaeidae	*Lygaeus equestris* (L.)	p	[207]
			m	[94]
		Lygaeus quadratomaculatus (L.)	m	[94]
	Pentatomidae	*Erthesina fullo* (Thunberg)	p	[94]
		Graphosoma rubrolineata (Westwood)	p	[94]
			p	[207]
		Halyomorpha halys (Stål)	p	[94]
		Lelia decempunctata Motschulsky	p	[94]
			p	[207]
		Menida scotti Puton	p	[94]
			p	[75]
		Menida violacea Motschulsky	p	[94]
			p	[75]
			p	[207]
		Pentatoma japonica (Distant)	p	[75]
			p	[207]
			p	[94]
		Pentatoma rufipes (L.)	p	[207]
			p	[94]
	Tingidae	*Physatocheila dumetorum* (Herrich-Schaeffer)	m	[208]
		Stephanitis nashi Esaki & Takeya	m	[94]
		Stephanitis pyriodes (Scott)	p	[94]
	Urostylidae	*Urochela distincta* Distant	p	[94]
		Urochela quadrinotata Reuter	p	[207]
Homoptera	Aphrophoridae	*Aphrophora intermedia* Uhler	p	[165]
			p	[94]IV
		Trigophora obliqua (Uhler)	p	[165]
	Callaphididae	*Chromocallis nirecola* (Shinji)	m	[205]
		Chromocallis pumili Zhang	m	[205]
		Chromocallis similinirecola Zhang	m	[205]
		Sinochaitophorus maoi Takahashi	m	[205]
		Tinocallis saltans (Nevsky)	m	[205]
			oo	[75]
	Cicadellidae	*Bythoscopus dorsalis* (Matsumura)	p	[57]
		Empoasca biguttula (Ishida)	p	[94]
		Oniella leucocephala Matsumura	p	[57]
		Tettigoniella viridis (Linné)	p	[94]V

Order	Family	Species	H. R.	Ref.
	Cicadidae	*Cryptotympana atrata* (Fabricius)	p	[178]
			p	[94]
		Cryptotympana mandarina Distant	p	[94]
			p	[75]
		Cryptotympana pustulata (Fabricius)	p	[75]
		Suisha coreana (Matsumura)	p	[75]
	Coccidae	*Ceroplastes japonicus* Green	p	[94]
		Eulecanium kostylevi Borchs.	m	[173]
		Eulecanium kuwanai Kanda	p	[173]
		Eulecanium rugulosum (Arch.)	p	[173]
		Parthenolecanium corni (Bouché)	p	[94]
		Pulvinaria vitis (L.)	p	[173]
	Diaspididae	*Fiorinia fioriniae* (Targioni-Tozzetti)	p	[94]
		Pseudaulacaspis pentagona (Targioni-Tozzetti)	p	[178]
			p	[75]
	Euscelidae	*Phlogotettix cyclops* (Mulsant et Rey)	p	[178]
	Fulgoridae	*Lycorma delicatula* (White)	p	[220]
			p	[165]
			p	[94]
	Membracidae	*Gargara genistae* (Fabricius)	p	[94]
	Pemphigidae	*Eriosoma dilanuginosum* Zhang	m	[205]
		Tetraneura akinire Sasaki	p	[205]
			m	[94]
		Tetraneura ulmi (L.)	m	[94]
	Pseudococcidae	*Eriococcus ulmi*Tang	m	[172]
	Psyllidae	*Cacopsylla peregrina* (Förster)	mo	[160]
Hymenoptera	Argidae	*Arge captiva* (Smith)	oo	[75]
Lepidoptera	Arctiidae	*Cyana phaedra* (Leech)	p	[94]VI
		Hyphantria cunea Drury	p	[45]
		Lemyra melli Daniel	po	[45]
			p	[166]VII
		Rhyparioides amurensis (Bremer)	p	[44]
			p	[166]
			p	[94]
			p	[45]
		Spilarctia subcarnea (Walker)	p	[94]
	Cossidae	*Cossus cossus* L.	p	[94]
			p	[166]
		Xyleutes leuconotus (Walker)	p	[94]
		Zeuzera pyrina L.	p	[166]
			p	[94]
			p	[178]

Order	Family	Species	H. R.	Ref.
	Crambidae	*Cotachena histricalis* (Walker)	p	[94]
	Ctenuchidae	*Amata pascus* (Leech)	p	[166]
	Epicopeiidae	*Epicopeia mencia* Moore	m	[94]
			m	[75]
			m	[78]
	Geometridae	*Abraxas flavisinuata* Warren	p	[94]
		Abraxas suspecta Warren	p	[178]
			p	[75]
			p	[94]VIII
		Abraxas sylvata (Scopoli)	p	[178]
		Apocheima cinerarius Erschoff	p	[78]
		Ascotis selenaria (Denis & Schiffermüller)	p	[75]
			po	[161]
		Ascotis selenaria dianaria Hübner	p	[94]
		Biston betularia L.	p	[94]
			p	[78]
		Culcula panterinaria (Bremer & Grey)	p	[75]
			p	[178]
			p	[94]
			p	[78]
		Heterophleps confusa (Wileman)	po	[195]
		Odezia atrata (L.)	po	[161]
			p	[78]
		Ophthalmodes giraffata(Guenee)	p	[178]
		Semiothisa hebesata (Walker)	p	[178]
		Yala pyricola Chu	p	[78]
	Lasiocampidae	*Gastropacha quercifolia* (L.)	p	[94]
		Malacosoma dentata Mell	p	[94]
		Malacosoma neustria testacea Motschulsky	p	[166]
			p	[94]
	Limacodidae	*Monema flavescens* Walker	p	[94]IX
			p	[78]IX
			p	[178]
			p	[75]
		Parasa consocia Walker	p	[78]
			p	[94]
		Parasa hilarata (Staudinger)	p	[94]
		Parasa sinica Moore	p	[94]
			p	[78]
	Lycaenidae	*Strymonidia w-album* (Knoch)	p	[94]
	Lymantriidae	*Arctornis alba* (Bremer)	p	[94]
		Arctornis gelasphora Collenette	p	[94]

Order	Family	Species	H. R.	Ref.
		Arctornis l-nigrum (Müller)	p	[94]
			p	[212]
			p	[75]
		Aroa substrigosa Walker	p	[94]
		Cifuna locuples Walker	p	[212]
			p	[166]
			p	[94]
			p	[178]
			p	[75]
		Dasychira chekiangensis Collenette	p	[94]
		Dasychira horsfieldi Saunders	p	[213]
		Euproctis chrysorrhoea (L.)	p	[212]
		Ivela ochropoda (Eversmann)	p	[94]X
			m	[212]
		Laelia coenosa (Hübner)	p	[75]
			p	[212]
			p	[94]
			p	[178]
		Laelia monoscola Collenette	p	[94]
		Lymantria dispar (L.)	p	[212]
			p	[166]
			p	[94]
		Lymantria dispar japonica Motschulsky	p	[94]
		Lymantria monacha (L.)	po	[212]
			p	[94]
		Porthesia similis (Fueslly)	p	[94]
		Stilpnotia melanoscela Collenette	p	[94]
			p	[75]
		Teia gonostigma (L.)	p	[213]
	Noctuidae	*Acronicta auricoma* (Denis & Schiffermüller)	po	[15]
		Acronicta hercules (Felder & Rogenhofer)	m	[166]
			m	[75]
			m	[228]XI
		Acronicta intermedia Warren	p	[94]XII
		Amphipyra perflua (Fabricius)	p	[94]
			po	[224]
		Amphipyra pyramidea (L.)	po	[224]
			p	[94]
		Calymnia affinis (L.)	oo	[15]
		Catocala fraxini (L.)	po	[224]
		Herminia tarsicrinalis (Knoch)	m	[94]XIII
		Orthosia incerta (Hufnagel)	p	[15]

Order	Family	Species	H. R.	Ref.
		Orthosia munda (Denis & Schiffermüller)	p	[15]
		Pangrapta vasava Butler	m	[224]
		Polia nebulosa (Hufnagel)	p	[15]
		Trachea atriplicis (L.)	m	[94]
		Zanclognatha griselda (Butler)	p	[94]
	Notodontidae	*Cnethodonta grisescens* Staudinger	po	[4]
			p	[94]
		Exaereta ulmi (Denis & Schiffermüller)	m	[4]
			m	[94]
		Gangarides dharma Moore	p	[94]
		Hybocampa umbrosa (Staudinger)	p	[94]
		Nericoides davidi (Oberthür)	m	[4]
			m	[94]
		Phalera assimilis (Bremer & Grey)	p	[4]
			p	[94]
		Phalera bucephala (L.)	p	[94]
			p	[4]
		Phalera flavescens (Bremer & Grey)	p	[4]
			p	[94]
			p	[178]
			p	[75]
		Phalera fuscescens Butler	p	[4]
			p	[94]
		Phalera takasagoensis Matsumura	p	[178]
			p	[75]
		Stauropus basalis Moore	m	[94]
	Nymphalidae	*Apatura iris* (L.)	p	[94]
		Hestina assimilis (L.)	p	[94]
		Mimathyma ambica Kollar	mo	[219]
		Mimathyma nycteis (Ménétrès)	oo	[219]
		Nymphalis antiopa (L.)	po	[219]
		Polygonia c-album (L.)	p	[178]
			po	[219]
			p	[94]
		Polygonia c-album asakurai Nakahara	po	[219]
		Polygonia c-aureum L.	m	[94]
		Vanessa cardui (L.)	m	[94]
		Vanessa indica Herbst	p	[178]
			p	[94]
	Pieridae	*Aporia crataegi* (L.)	p	[94]
	Psychidae	*Chalioides kondonis* Kondo	p	[94]

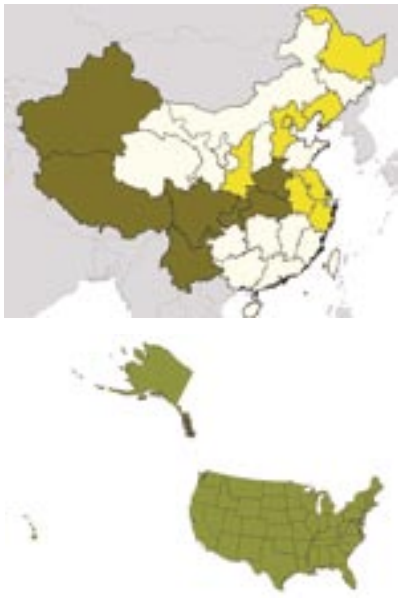
Order	Family	Species	H. R.	Ref.
		Clania minuscula Butler	po	[78]
			p	[94]XIV
	Saturniidae	*Aglia tau ferenigra* Th. Mieg	p	[226]
		Dictyploca japonica Moore	p	[94]
			p	[75]
		Eriogyna pyretorum (Westwood)	p	[94]
			p	[226]
		Neoris haraldi Schawerda	p	[226]
		Syntherata loepoides Butler	p	[226]
	Sphingidae	*Amorpha sinica* Rothschild & Jordan	p	[225]
			po	[227]
		Callambulyx orbita Chu & Wang	p	[75]
		Callambulyx tatarinovi (Bremer & Grey)	p	[225]
			po	[227]
			p	[94]
		Mimas tiliae christophi (Staudinger)	p	[225]
			po	[227]
			p	[94]
		Parum porphyria (Butler)	p	[94]
		Smerinthus planus Walker	p	[94]
	Tortricidae	*Acleris alnivora* Oku	po	[133]
		Acleris cristana (Denis & Schiffermüller)	p	[133]
			po	[78]
		Acleris ulmicola (Meyrick)	p	[133]
		Archips crataegana (Hübner)	p	[133]
		Archips xylosteana (L.)	p	[133]
		Choristoneura diversana (Hübner)	p	[133]
		Epinotia tenerana (Denis & Schiffermüller)	p	[133]
		Pandemis corylana (Fabricius)	p	[94]
		Pandemis heparana (Schiffermüller)	p	[133]
			p	[94]
		Pandemis ribeana (Hübner)	p	[133]
			p	[94]
		Ptycholoma lecheana (L.)	p	[133]
			p	[75]
Orthoptera	Oedipodidae	*Locusta migriatoria manilensis* (Meyen)	p	[94]
Parasitiformes	Phytoseiidae	*Amblyseius oguroi* Ehara	p	[75]
		Phytoseius huaxiensis Xin, Liang & Ke	p	[75]
Thysanoptera	Phlaeothripidae	*Rhynchothrips fuscus* Steinweden & Moulton	m	[66]
		Rhynchothrips turkestanicus John	m	[66]
	Thripidae	*Frankliniella intonsa* (Trybom)	p	[75]
		Thrips major Uzel	m	[66]

Verbascum thapsus
Common mullein

Introduction
The genus *Verbascum* contains approximately 300 species worldwide primarily in the temperate regions of Asia and Europe. Five species and one subspecies are recorded from China, primarily in Xinjiang, northwestern China[71, 216].

Taxonomy
Order: Tubiflorae
Suborder: Solanieae
Family: Scrophulariaceae
Genus: *Verbascum* L.
Species: *Verbascum thapsus* L.

Description
Verbascum thapsus is a biennial herbaceous plant up to 1.5 m in height, with densely light grayish yellow stellate hairs. The basal leaves and those in the lower part of the stem are oblancelate oblong, 15 cm long and 6 cm wide, and narrowly petiole-like at base, with crenate margins. The leaves in the upper part of stem are gradually decreasing in size upward into oblong and ovoid oblong in shape, with base decurrent into narrow wings. The inflorescences are panicles in arrangement of cylindrical shape, 30 cm in length and 2 cm in diameter, but expanded when in fruit. The dense flowers occur in clusters (at least in the lower part of the florescence) on the very short pedicel. Calyx is 7 mm long, and lancelately lobed. Corolla is yellow and 1-2 cm in diameter. Filaments of posterior 3 out of 5 stamens are pubescent, whereas the 2 anterior ones are glabrous. The anthers are divergent at base of the lobes. Flowers appear in June through August, and followed in July through October by fruits, which are ovate capsules equal to persistent calyx in length[11].



Habitat
Verbascum thapsus occurs on grassy slopes, and grasslands near rivers banks at elevations of 700-3200 m[54, 216].

Distribution
Verbascum thapsus occurs in the western provinces of Sichuan, Tibet, Xinjiang, and Yunnan[71, 216]; the Jigongshan Mountains on the borders of Henan and Hubei[29, 54], two provinces of central China; and Jiangsu and Zhejiang provinces of eastern China where it is suspected to have escaped cultivation[88, 214]. Cultivation of *Verbascum thapsus* is also reported from Anhui, Hebei, Heilongjiang, and Liaoning provinces[18, 37, 105, 222].

Species of *Verbascum* in China

Scientific Name	Scientific Name
V. blattaria L.	*V. phoeniceum* L.
V. chaixii Vill. subsp. *orientale* Hayek	*V. songoricum* Schrenk
V. chinense (L.) Santapau*	***V. thapsus* L.**

*Recorded as *V. coromandelianum* (Vahl) O. Kuntze in *FRPS*

Economic Importance
Verbascum thapsus is cultivated as an ornamental. In addition, the plant contains a volatile essential oil and viscous materials used as a lubricant[37, 88].

Related Species
Another *Verbascum* species that occurs in Xinjiang is *V. chinense* (L.) Santapau, previously recorded as *V. coromandelianum* (Vahl) O. Kuntze in many floras. It occurs in sandy areas along rivers at elevations of 120-1300 m, in Guangxi, Sichuan, and Yunnan provinces[216].

Natural Enemies of *Verbascum*
Only one arthropod is listed as an associate of members of the genus *Verbascum*.

Arthropods

Order	Family	Species	H. R.	Ref
Hemiptera	Miridae	*Campylomma verbasci* (Meyer-Duer)	po	[93]

Viburnum opulus

Guelder rose, European cranberry

Introduction

The genus *Viburnum* contains approximately 200 species worldwide. Seventy-four species have been recorded in China with nationwide distribution, but mainly in southwestern China[192].

Taxonomy

Order Dipsacales
Family Caprifoliaceae
Tribe Viburneae (Spach) Fritsch
Genus *Viburnum* L.
Section Opulus DC.
Species *Viburnum opulus* L.

Description

Viburnum opulus is a deciduous shrub 1.5-4 m high. Annual twigs are striped, glabrous, with noticeable raised lenticels on the surface; biennial twigs are yellowish or reddish brown, and nearly cylindrical; while perennial twigs and stem are dark grayish, with thin bark that is non-corky and vertically cracked. Winter buds are ovate, stalked, covered by a pair of glabrous concrescent outer scales, and membranous inner scales that grow concrescently into a cylindrical form at the base. The leaf blade is ovate to broadly so, or obovate, 6-12 cm long, commonly 3-lobed with digitately ternate veins. The glabrous leaf has a round, cuneate, or subcordate base. The lobe has an acuminate apex, and an irregular dentate margin. The leaves in the upper stem are narrow, elliptic to oblong-lanceolate, without lobes with sparsely crenate margin, or slightly lobed with nearly entire margins, the lateral one is shorter than the middle one. The petiole is robust, 1-2 cm long, glabrous, with no less than 2 oblong-disc glands and 2 basal stipules. The compound umbel-shaped cyme inflorescence has a diameter of 5-10 cm, with 6-8 primary whorled branches. Sessile, sterile and fertile flowers are borne on the secondary braches. The glabrous calyx of fertile flowers is conical, about 1 mm long, and triangularly lobed. Corollas are white, crenulate lobed, about 1 mm long, and villous inside. Sterile flowers, borne on a long pedicel, are white, 1.3-2.5 cm in diameter, and have broadly obovate, crenate or irregular lobes. Fruits are red, nearly round, 8-10 mm in diameter with grayish, oblate core 7-9 mm in diameter. The flowers occur in May through June; fruits ripen in September through October[192].

Habitat and Distribution

V. opulus occurs under the spurge in the valley forest at elevation of 1000-1600 m in northwestern Xinjiang, and is cultivated in Beijing[18, 192].

Economic Importance

V. opulus is grown primarily as an ornamental [18].

Related Species

V. opulus var. *calvescens* has thick, corky bark. The twigs, petiole and rachis are glabrous, but hairs cluster in the vein axils on the lower leaf surface and appressed sericeous hairs occur sparsely along the veins. The anthers are purplish red while that of *Viburnum opulus* var. *opulus* are whitish yellow. *V. opulus* var. *calvescens* occurs in sparse forests, on stream banks or in thickets at elevations of 1000-1650 m, in southwestern Anhui, southern Gansu, northern Hebei, Heilongjiang, western Henan, Hubei, Jiangxi, Jilin, Liaoning, southern Shaanxi, Shandong, Shanxi, Sichuan, and northwestern Zhejiang provinces. *V. opulus* var. *calvescens* (Rehd.) Hara forma *puberulum* (Kom.) has a yellow villous petiole, rachis, young shoot and leaf underside. It occurs in mixed forests near rivers or forest margins at elevations of 1200-2200 m[192].

Natural Enemies of *Viburnum*

Fourteen species of fungi and 14 arthropods are listed for members of the genus *Virburnum*. One fungus, *Phaeoramularia penicillata* (Ces.) X.J. Liu & Y.L. Guo, and one mite, *Calacarus carinatus* (Green) are *V. opulus* associated.

Species of *Viburnum* in China

Scientific Name	Scientific Name
V. amplifolium Rehd.	*V. laterale* Rehd.
V. atrocyaneum C. B. Clarke	*V. leiocarpum* Hsu
V. betulifolium Batal.	*V. longipedunculatum* (Hsu) Hsu
V. brachybotryum Hemsl.	*V. longiradiatum* Hsu et S. W. Fan
V. brevipes Rehd.	*V. lutescens* Blume
V. brevitubum (Hsu) Hsu	*V. luzonicum* Rolfe
V. buddleifolium C. H. Wright	*V. macrocephalum* Fort.
V. burejaeticum Regel et Herd.	*V. melanocarpum* Hsu
V. burmanicum (Rehd.) C. Y. Wu ex Hsu	*V. mongolicum* (Pall.) Rehd.
V. chingii Hsu	*V. mullaha* Buch.-Ham. ex D. Don
V. chinshanense Graebn.	*V. nervosum* D. Don
V. chunii Hsu	*V. odoratissimum* Ker-Gawl.
V. cinnamomifolium Rehd.	*V. oliganthum* Batal.
V. congestum Rehd.	*V. omeiense* Hsu
V. corymbiflorum Hsu et S. C. Hsu	***V. opulus* L.**
V. cotinifolium D. Don	*V. parvifolium* Hayata
V. cylindricum Buch.-Ham. ex D. Don	*V. plicatum* Thunb.
V. dalzielii W. W. Smith	*V. propinquum* Hemsl.
V. davidii Franch.	*V. punctatum* Buch.-Ham. ex D. Don
V. dilatatum Thunb.	*V. pyramidatum* Rehd.
V. erosum Thunb.	*V. rhytidophyllum* Hemsl.
V. erubescens Wall. ex DC.	*V. schensianum* Maxim.
V. farreri W. T. Stearn	*V. sempervirens* K. Koch
V. foetidum Wall.	*V. setigerum* Hance
V. fordiae Hance	*V. shweliense* W. W. Smith
V. formosanum Havata	*V. squamulosum* Hsu
V. glomeratum Maxim.	*V. subalpinum* Hand.-Mazz.
V. grandiflorum Wall. ex DC.	*V. sympodiale* Graebn.
V. hainanense Merr. et Chun	*V. taitoense* Hayata
V. hanceanum Maxim.	*V. tengyuehense* (W. W. Smith) Hsu
V. hengshanicum Tsiang ex Hsu	*V. ternatum* Rehd.
V. henryi Hemsl.	*V. trabeculosum* C. Y. Wu ex Hsu
V. inopinatum Craib	*V. triplinerve* Hand. -Mazz.
V. integrifolium Hayata	*V. urceolatum* Sieb. et Zucc.
V. kansuense Batal.	*V. utile* Hemsl.
V. koreanum Nakai	*V. wrightii* Miq.
V. lancifolium Hsu	*V. yunnanense* Rehd.

Fungi

Phylum	Family	Species	H. R.	Ref.
Ascomycota	Asterinaceae	*Asterina viburni* Pat.	oo	[26]
	Meliolaceae	*Irenina viburni* (Syd.) F. Stevens	oo	[26]
		Meliola aequatoriensis Petr.	mo	[26]
Basidiomycota	Pucciniaceae	*Puccinia linkii* Klotzsch	mo	[229]
		Puccinia viburnicola J.Y. Zhuang	oo	[229]
Anamorphic Dothideales		*Placosphaeria viburni* Henn.	mo	[26]
Anamorphic *Leptosphaeria*		*Phoma exigua* var. *viburni* (Roum. ex Sacc.) Boerema	mo	[1][I]
Anamorphic *Mycosphaerella*		*Cercospora penicillata* (Ces.) Fresen.	oo	[26]
		Cercospora viburni-cylindrici F.L. Tai	mo	[26]
		Phaeoramularia penicillata (Ces.) X.J. Liu & Y.L. Guo	o	[65]
		Septoria viburni Westend.	mo	[26]
Anamorphic *Otthia*		*Stigmina tinea* (Sacc.) M.B. Ellis	mo	[26][II]
Anamorphic *Rhytisma*		*Melasmia viburni* Sawada	mo	[26]
Anamorphic Uredinales		*Aecidium viburni* Henn. & Shirai	oo	[26]

[I]Recorded as *Ascochyta viburni* (Roumeguere) Saccardo
[II]Recorded as *Cercospora tinea* Sacc.

Arthropods

Order	Family	Species	H. R.	Ref
Acariformes	Eriophyidae	*Calacarus carinatus* (Green)	p	[90]
Coleoptera	Chrysomelidae	*Monolepta hieroglyphica* (Motschulsky)	po	[165]
		Pyrrhalta humeralis (Chen)	po	[201]
			oo	[165]
	Eumolpidae	*Colaspoides femoralis* Lefèvre	po	[164]
			po	[75]
	Scolytidae	*Cnestus maculatus* Browne	po	[165]
		Cryphalus viburni Stark	mo	[197]
		Scolytoplatypus darjeelingi Stebbing	po	[165]
Lepidoptera	Drepanidae	*Oreta eminens* (Bryk)	po	[75]
		Oreta pulchripes Butler	mo	[178]
			po	[75]
		Oreta turpis (Butler)	mo	[178]
			mo	[75]
	Lycaenidae	*Celastrina albocaerulea* Moore	po	[178]
	Nymphalidae	*Athyma fortuna* (Leech)	oo	[178]
	Tortricidae	*Acleris submaccana* (Filipjev)	po	[133]
Thysanoptera	Phlaeothripidae	*Liothrips kuwayainai* (Moulton)	po	[66]

Wisteria species
Wisteria

Introduction
The genus *Wisteria* contains approximately ten members occurring in East Asia, North America and Australia. Five species and one form are reported from China[174].

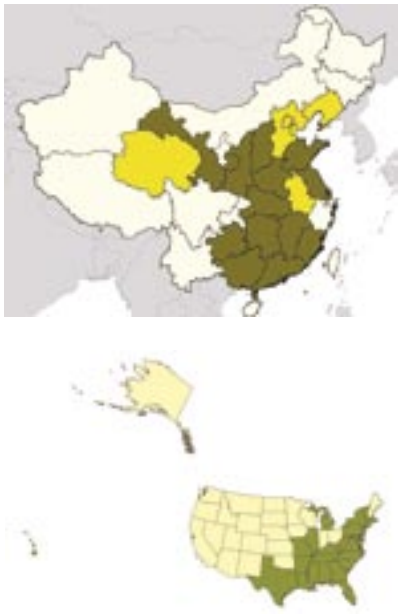
I. *Wisteria sinensis*
Chinese wisteria

Taxonomy
Order: Rosales
Suborder: Leguminosae
Family: Leguminosae (Fabaceae)
Subfamily: Papiliobideae
Tribe: Tephrosieae
Genus: *Wisteria* Nutt.
Species: *Wisteria sinensis* (Sims) Sweet.

Description
Wisteria sinensis is a deciduous climbing vine. The stout stem, covered with glabrescent white hairs, twines clockwise. Winter buds are ovate. The imparipinnate leaf is 15-25 cm long, and composed of 3-6 pairs of leaflets, which are ovoid elliptic to ovoid lanceolate, acuminate or somewhat caudate apically and obtuse, cuneate or asymmetrical at the base, 5-8 cm in length and 2-4 cm in width decreasing in size along the stem from the base to the apex. The caduceus stipule is linear whereas the stipel is bristle-like and persistent. The inflorescence, a pendulous flower cluster, appears in the terminal bud or axillary bud of the previous year's twigs. The clusters are 15-20 cm in length and 8-10 cm in diameter. The axil is villous. Bracts are lanceolate and caducous. The fragrant flowers are borne on a slender pedicel 2-3 cm long. The calyx is campanulate or cup-shaped, 5-6 mm long and 7-8 mm wide, with two obtuse teeth on the upper side and three ovoid triangular teeth on the lower side. Corollas are sericeous, obtuse and bifid on the upper edge and trifid on the lower edge. Petals are purple. *W. sinensis* blooms from mid April to early May, followed in June to August by persistent, oblanceolate, tomentose pods, 10-15 cm long and 1.5-2 cm wide, containing 1-3 brown, oblate seeds [174].

Species of *Wisteria* in China

Scientific Name	Scientific Name
***W. sinensis* (Sims) Sweet**	*W. venusta* Rehd. et Wils.
W. brevidentata Rehd.	***W. floribunda* (Willd.) DC.**
W. villosa Rehd.	



Habitat
W. sinensis occurs in valleys, mountain forests, and on slopes at elevations of 500-1800 m[82, 174].

Distribution
W. sinensis occurs in Guizhou, Guanxi, Henan, Shaanxi, Yunnan provinces and southern Hebei province. [174].

Economic Importance
W. sinensis is usually planted to climb on a trellis as an ornamental. The seeds contain sparteine which is considered to be medicy useful. The bark is a fiber sources[82, 88, 174].

Related Species

W. sinensis (Sims) Sweet f. *alba* (Lindl.) Rehd. et Wils. can be distinguished from *W. sinensis* (Sims) Sweet by flower color. The former is white and the latter is purple. *W. sinensis* f. *alba* is native to Hubei province and is widely cultivated throughout the nation[174].

II. *Wisteria floribunda*
Japanese wisteria

Taxonomy

Order: Rosales
Suborder: Leguminosae
Family: Leguminosae (Fabaceae)
Subfamily: Papiliobideae
Tribe: Tephrosieae
Genus: *Wisteria* Nutt.
Species: *Wisteria floribunda* (Willd.) DC.

Description

W. floribunda is a deciduous vine with reddish-brown bark. Unlike, *W. sinensis*, the stem of *W. floribunda* twines counter-clockwise. The slender, brown stem is densely branched and puberscent when young becoming glabrous as it grows. The pinnately compound leaves are about 20-30 cm long, and composed of 5-9 pairs of leaflets, each of which is papery thin, 4-8 cm long and 1-1.25 cm wide with an acuminate apex and obtuse or somewhat asymmetric base with an appressed pubescence when young, ovoid lanceolate and gradually narrowing downward along the leaf axil. In late April to mid May, racemes, about 30-90 cm in length, appear in the terminal axil, blooming sequentially upwards. Each floret appears on the inflorescence, from base to apex along the densely pubescent rachis, becoming about 1.5-2 cm in length. Calyx is cup-shaped, 4-5 mm long and 5-6 mm wide, and covered with the soft, silky hairs. Corollas are violet to blue violet. The fruits follow in May to July, as oblanceolate, tomentose pods, 12-19 long and 1.5-2 cm wide, containing 3-6 glossy, orbicular, violet purple seeds, about 1-1.4 cm[174].

Distribution

W. floribunda is native to Japan and introduced to China where it is cultivated nationwide[174].

Natural Enemies of *Wisteria*

Only two species of fungi have been reported to occur on members of the genus *Wisteria*. Eighteen species of arthropods are associated with *W. sinensis*. Two out of the 18 species may be host specific.

Fungi

Phylum	Family	Index of Fungi	H. R.	Ref.
Anamorphic *Leptosphaeria*		*Coniothyrium kraunhiae* Miyake	m†	[26]
Anamorphic *Mycosphaerella*		*Pseudocercospora wisteriicola* (J.M. Yen) J.M. Yen	m	[129]

† Can attack *Wisteria sinensis*

Arthropods

Order	Family	Species	H. R.	Ref.
Coleoptera	Curculionidae	*Episomus chinensis* Faust	p†	[178]
Homoptera	Aphididae	*Aphis craccivora usuana* Zhang	p†	[113]
		Aulacophoroides hoffmanni (Takahashi)	m†	[205]
			p†	[113]
	Cicadellidae	*Tettigoniella albomarginata* (Signoret)	p†	[57]

Order	Family	Species	H. R.	Ref.
Lepidoptera	Gelechiidae	*Dichomeris oceanis* Meyrick	p†	[78]
	Limacodidae	*Parasa sinica* Moore	p†	[78]
	Lycaenidae	*Celastrina argiola* (L.)	p‡	[219]
		Curetis acuta Moore	p†	[178]
	Lymantriidae	*Cifuna locuples* Walker	p†	[212]
			p†	[75]
			p†	[178]
			p†	[166]
		Euproctis flava (Bremer)	p†	[212]
			p†	[75]
			p†	[178]
	Noctuidae	*Catocala patala* Felder & Rogenhofer	m‡	[224]
		Hypopyra vespertilio (Fabricius)*	m‡	[224]
	Notodontidae	*Pterostoma sinicum* Moore	p‡	[4]
			p‡	[75]
	Nymphalidae	*Neptis soma* Moore	p‡	[219]
	Saturniidae	*Loepa damaritis* Jordan	p†	[226]
	Tortricidae	*Homona magnanima* Diakonoff	p†	[75]
			p†	[78]
Thysanoptera	Thripidae	*Frankliniella intonsa* (Trybom)	p†	[66]
			p†	[75]
		Megalurothrips distalis (Karny)	p†	[66]

*Recorded as *Enmonodia vespertilio* (Fabricius)

† Can attack *Wisteria sinensis*

Glossary

Achene – a small, dry, thin-walled one-seeded fruit that does not split open at maturity

Acuminate – gradually tapering to a point

Acute – having a sharp point

Adnate – fused to a different part

Adventitious – a root arising from an area other than the primary root system

Alternate (leaves) – arranged singly along stem, not paired or whorled

Annual – a plant having a one-year or one season life cycle

Anther – the sac-like, pollen producing part of the stamen

Apex – the tip of an organ

Apiculate – having a short, sharp point

Appressed – lying close and flat against

Arachnoid – hairs resembling the interlaced filaments of a spiderweb

Attenuate – gradually narrowing

Auricle – small ear-like appendage

Awn – a bristle-like appendage

Axil – angle formed by the upper side of a leaf and the stem from which it grows

Axillary – in the axil

Baculiform – rod-shaped

Basal – located at the base

Base – part of attachment of any organ

Berry – a fleshy, indehiscent fruit containing one to many seeds

Biennial – a plant with a two-year life cycle, producing vegetative growth the first year and flowering in the second

Bipinnate – pinnate, with the primary leaflets also pinnate

Bract – modified, scale-like leaves, situated at the base of a flower, fruit or inflorescence

Branchlet – a small branch, a twig

Bud – an underdeveloped leaf, flower or shoot

Bud scale – a scale enclosing or partially enclosing a bud

Bullate – having surface blisters

Caducous – falling off, shedding early

Calyx – collective term for the sepals of a flower

Campanulate – bell-shaped

Canopy – the uppermost layer of a forest, formed by the crowns of trees

Capitate – growing in heads, as flowers in the Compositae

Capsule – a dry, thin-walled fruit containing 2 or more seeds opening along grooved lines at maturity

Caryopsis – a dry, single-seeded indehiscent fruit characteristic of cereal grasses

Catkin – a drooping cluster of reduced, stalkless unisexual flowers without petals

Caudate – having a tail-like appendage

Ciliate – fringed by long hairs

Clavate – club-shaped

Concolorous – having a uniform color

Cordate – heart-shaped

Corolla – collective term for the petals of a flower

Corymb – an indeterminate inflorescence with stalked flowers

Crenate – having small, rounded teeth

Crown – the mass of branches, twigs and leaves forming the top of tree

Crown gall – a tumor-like growth caused by a bacterial disease

Culm – the jointed, flowering stem of grasses

Cuneate – wedge-shaped

Cupuliform – cup-shaped

Cyathium – a type of inflorecence found in the genus *Euphorbia*

Cylindroid – cylinder-shaped

Cyme – a branching inflorescence with a flower at the end of each branch

Deciduous – seasonal shedding of leaves; shedding of certain plant parts after a period of growth

Decumbent – growing along the ground with stem tips upright

Dehiscent – opening naturally at maturity, as a fruit releasing seeds

Dentate – toothed

Denticles – small teeth

Denticulate – finely toothed

Dichotomus – dividing into two equal branches, forked

Digitate – palmate with narrow leaflets

Dioecious – having male and female flowers on separate plants

Dissected – deeply divided into segments

Distal – distant from the point of attachment

Drupe – a fleshy fruit, containing one or more seeds, each enclosed in a stony endocarp

Emarginate – distinctly notched at the apex

Evergreen – retaining leaves year around

Filament – a fine, thread-like structure

Filiform – thread-like

Flexuous – wavy

Floret – a small flower

Fruit – a mature ovary containing seeds

Furcate – forked

Glabrescent – becoming hairless

Glabrous – hairless

Glandular – having glands (structures secreting

oil or nectar)

Globose – spherical or globe-shaped

Glume – a single bract at the base of a spikelet in the Graminaceae

Gram-positive – a basic dye staining technique used to determine the genus of a bacterium; gram positive bacteria retain the dark violet color of the dye stain

Hastate – spearhead-shaped, with basal lobes directed outwards

Herbaceous – composed of soft, non-woody tissue

Hirsute – covered by coarse hairs

Hypanthium – a flower's cup-like base

Imbricate – overlapping scales

Inflorescence – the arrangement of flowers on a plant

Internode – the part of the stem between the nodes

Involucre – a whorl of bracts beneath an inflorescence

Keel – a sharp ridge formed by two fused lower petals

Knot – hard tissue formed where a branch grows from a tree trunk

Labiate – having lips

Lanceolate – lance-shaped, longer than wide with a pointed tip; widest at the middle or below

Lateral – at the side

Leaf sheath – lower part of the leaf stalk enclosing the stem

Leaflet – single part of a compound leaf

Legume – dry fruit usually opening along two lines as in the Pea family

Lemma – in grasses, the lower of the two bracts that enclose the flower

Lenticel – a pore in the stem allowing gas exchange between the inside and outside of a plant

Ligule – strap-shaped projection at the base of a leaf blade

Lobe – rounded area of an organ

Margin – the outside edge

Membranous – thin, semi-transparent

Mericarp – a one-seeded section of a fruit that breaks free from a schizocarp at maturity

Monoecious – having both male and female flowers on the same plant

Monophagous - feeding on a single food source

Mosaic – a virus disease of plants causing mottling of leaves

Mucronate – ending abruptly in a sharp point

Mycoplasma – (more appropriately micoplasma-like organisms MLO) bacteria-like organisms that cause diseases in plants

Nectariferous – bearing nectar-producing glands

Node – place of leaf or branch attachment on the stem

Nutlet – a small nut; often refers to an achene

or mericarp

Oblanceolate – broadest toward the tip and tapering to the stalk, inversely lanceolate

Oblique – unequal, one side of leaf extending below the opposite side

Obovate – broadest toward the tip and tapering to the stalk, inversely ovate

Obtuse – blunt

Oceania - a large group of islands in the south Pacific including Melanesia and Micronesia and Polynesia (and sometimes Australasia and the Malay Archipelago)

Oligophagous - feeding on a limited range of food sources

Opposite – occurring in pairs at the node, one leaf on each side of the stem

Orbicular – circular

Ovate – egg-shaped, pointed at the top and broader toward the base

Palea – upper two bracts enclosing a grass flower

Palmate – having 3 or more divisions or lobes, the appearance of fingers on an outspread hand

Panicle – a multi-branched inflorescence

Pappus – a bristle, scale or crown on seed-like fruits especially on thistles

Pedicel – the stalk of a single flower

Pedicellate – of a flower, stalked

Peduncle – the main flower stem or stalk holding an inflorescence

Pendent – pendulous, hanging down

Perennial – living for a number of years

Perianth – the calyx and corolla or the outer whorl

Petal – the basic unit of the corolla, usually flat, broad and brightly colored

Petiole – the stalk like part of a leaf that attaches it to the stem

Petioule – the stalk of a leaflet in a compound leaf

Phloem – vascular tissue that conducts sap

Pilose – softly hairy

Pinna(e) – primary leaflet of a compound leaf

Pinnate – having leaflets along the sides of a common central stalk, like a feather

Pinnatifid – pinnately lobed

Pinnatipartite – pinnately divided

Pistil – female organ of the flower consisting of the ovary, style and stigma

Pistillate – having one or more pistils, without functional stamens

Pod – a dry, many seeded fruit that opens at maturity found in members of the Leguminoseae

Polyphagous - utilizing a wide variety of food sources

Pome – a fleshy fruit with a papery-walled inner chamber that contains the seeds

Procumbent – lying along the ground

Puberulent – minutely covered in soft hairs

Puberulous – slightly hairy

Pubescent – downy, covered with hairs

Pyrene – the stone of a drupe, seed surrounded by a hard endocarp

Raceme – a long flower cluster with individual flowers on a small stalk attached to a larger, central stalk

Rachilla – in grasses, a secondary axis of an inflorescence

Rachis – the axis of a compound leaf or inflorescence

Reniform – kidney-shaped

Repand – having a slightly sinuate margin

Retuse – slightly notched at the apex

Revolute – rolled downwards at the margin

Rhizome – an underground, horizontal, root-like stem having buds, shoots and adventitious roots

Rootstock – underground stem or rhizome

Sagittate – arrowhead-shaped

Samara – a dry, indehiscent, winged fruit

Scabrid – somewhat rough to the touch because of tiny projections

Scabrous – rough to the touch

Scaphoid – boat-shaped

Schizocarp – a fruit which breaks up at maturity into two or more one-seeded portions (mericarps)

Semi-decumbent – nearly decumbent

Sepal – basic unit of the calyx

Sericeous – silky

Serrate – having a saw-tooth margin

Sessile – stalkless

Shrub – woody, low growing plant with branches

Spathe – bract or pair of bracts, enclosing the flower

Spike – elongated flower cluster, each flower of which is stalkless

Spikelet – a grass inflorescence where one or more flowers are subtended by a pair of glumes

Spinose – spiny

Spinules – small spines

Stamen – the male organ of the flower, made up of a filament topped by an anther

Staminate – a male flower with anthers and without pistils

Stellate – star-shaped

Stigma – tip of the pistil where the pollen lands

Stipule – small appendage, often leaf-like on either side of the petiole

Stolon – a stem growing along or under the ground, a runner

Style – the narrow part of the pistil that connects the ovary to the stigma

Subcordate – nearly heart-shaped, more or less

Suborbicular – nearly circular

Subshrub – a low growing shrub, may have herbaceous stems

Subtropical - regions adjacent to the tropics ranging in latitude from 23.5 to 35 dgrees

Sulcate – grooved

Syncarp – a fleshy, multiple fruit with fused carpels
Syconium – a fleshy fruit with multiple seeds in a hollow compartment, as in the genus *Ficus*

Tannin – an acidic, water soluble, bitter tasting substance

Tendril – slender, coiling, thread-like structure that helps to secure climbing plants

Terminal – at the end or apex

Thyrse – mixed inflorescence with an indeterminate main axis and determinate secondary axes

Tomentose – densely covered with soft hairs

Tomentum – dense covering of hairs

Trifoliate – having three leaflets

Trifurcate – forked, divided into 3 equal branches

Tropical - occurring in the region extending to 23 degrees on either side of the equator

Truncate – appearing to be cut off at either the base or the apex

Tuber – an enlarged, fleshy underground stem serving as a storage organ

Tuberculate – bearing small, wart-like projections

Twining – encircling or coiling around

Umbel – flower cluster with flower stalks growing from the same point

Variety - a rank designating plant groups which vary in flower color or some other way

Ventral – the side facing the axis

Verrucose – covered with small warts, tuberculate

Villous – covered with long, shaggy hairs

Witches' broom – an abnormal growth of dense twigs caused by mites, fungi or viruses

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Appendix

Arundo donax
UGA 0016140 - James H. Miller, USDA Forest Service; http://www.forestryimages.org
UGA 0016141 - James H. Miller, USDA Forest Service; http://www.forestryimages.org

Carex kobomugii
Les Mehrhoff, IPANE - Invasive Plants of New England, University of Connecticut

Gypsophila paniculata
Klenn Kopp, Missouri Botanical Garden (2 images)

Lepidium latifolium
Joseph Ditomaso, University of California, Davis (2 images)

Lygodium microphyllum
UGA 2308087 - Peggy Grebb, USDA ARS; http://www.forestryimages.org

Melia azedarach
UGA 0016025 - Ted Bodner, Southern Weed Science Society; http://www.forestryimages.org

Miscanthus sinensis
UGA 0016161 - James H. Miller, USDA Forest Service; http://www.forestryimages.org

Murdannia keisak
UGA 2308037 - Mil Pyne, USDA NRCS; http://www.forestryimages.org

Phalaris arundinacea
UGA 1196192 - Michael Shephard, USDA Forest Service; http://www.forestryimages.org
UGA 1196188 - Michael Shephard, USDA Forest Service; http://www.forestryimages.org

Phleum pratense
UGA 1213019 - Dave Powell, USDA Forest Service; http://www.forestryimages.org

Phragmites australis
UGA 0002045 - Bernd Blossey, Cornell University; http://www.forestryimages.org

Polygonum perfoliatum
Denise Binion, USDA Forest Service (2 images)

Populus alba
UGA 0008421 - Paul Wray, Iowa State University; http://www.forestryimages.org

Potamogeton crispus
Robert H. Mohlenbrock, USDA-NRCS PLANTS Databse; http://plants.usda.gov

Pueraria lobata
UGA 1162002 - David Moorehead, University of Georgia ; http://www.forestryimages.org

Quercus acutissima
Denise Binion, USDA Forest Service, FHTET
UGA 1237024 - Chuck Bargeron, University of Georgia; http://www.forestryimages.org

***Reynoutria cuspidatum* (*Polygonum cuspidata, Fallopia japonica*)**
UGA 1196035 - Michael Shephard, USDA Forest Service; http://www.forestryimages.org
UGA 2308046 - Les Mehrhoff, University of Connecticut; http://www.forestryimages.org

Rhamnus cathartica
UGA 0008307 - Paul Wray, Iowa State University; http://www.forestryimages.org
UGA 0008184 - Paul Wray, Iowa State University; http://www.forestryimages.org

Rhamnus frangula
UGA 1260057 - Gil Wojciech, Polish Forest Research Institute; http://www.forestryimages.org

Rosa multiflora
UGA 0016231 - James H. Miller, USDA Forest Service; http://www.forestryimages.org
UGA 2307113 - James H. Miller, USDA Forest Service; http://www.forestryimages.org
UGA 1380239 - Chris Evans, University of Georgia; http://www.forestryimages.org

Rottboellia exaltata
Larry Allain, USDA-NRCS PLANTS Database; http://plants.usda.gov

Rubus ellipticus
Forest and Kim Starr, US Geological Survey(USGS), Makawao, Hawaii

Rubus nivens
Forest and Kim Starr, US Geological Survey(USGS), Makawao, Hawaii

Rubus phoenicoliasus
Denise Binion, USDA Forest Service, FHTET

Rumex acetosella
Denise Binion, USDA Forest Service, FHTET
Merel R. Black, University of Wisconsin, Madison, WI

Rumex crispus
Stephen L. Solheim, University of Wisconsin, Madison, WI

***Sapium sebiferum* (*Triadica sebifera*)**
UGA 2307040 - James H. Miller, USDA Forest Service; http://www.forestryimages.org
UGA 0016032 **-** Ted Bodner, Southern Weed Science Society; http://www.forestryimages.org

Setaria faberii
Dan Tenaglia, http://www.missouriplants.com (2 images)

Spiraea japonica
Denise Binion, USDA Forest Service, FHTET (2 images)

Stellaria media
UGA 1196235 - Elizabeth Bella, USDA Forest Service; http://www.forestryimages.org

Tamarix ramosissima
UGA 1624020 - Steve Dewey, Utah State University; http://www.forestryimages.org

Taxus cuspidata
Denise Binion, USDA Forest Service, FHTET
J. S. Peterson, USDA NRCS PLANTS Database; http://plants.usda.gov (inset)

Tribulus terrestris
UGA 0022069 - Eric Coombs, Oregon Department of Agriculture; http://www.forestryimages.org

Ulmus pumila
UGA 2308005 - Patrick breen, Oregon State University; http://www.forestryimages.org

Verbascum thapsus
Denise Binion, USDA Forest Service, FHTET (2 images)

Viburnum opulus
UGA 1261162 - Gil Wojciech, Polish Forestry Research Institute; http://www.forestryimages.org

Denise Binion, USDA Forest Service, FHTET (fruits)

Wisteria floribunda
UGA 230041 - J. Scott Peterson, USDA NRCS; http://www.forestryimages.org
Denise Binion, USDA Forest Service, FHTET (flowers)

Wisteria chinensis
UGA 1120457 - Ted Bodner, Southern Weed Science Society; http://www.forestryimages.org
UGA 2307175 - Ted Bodner, Southern Weed Science Society; http://www.forestryimages.org

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