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2004/040 Invasive alien plants in the EPPO region

The EPPO Panel on Invasive Alien Species, on the basis of questionnaires returned by member countries and data compiled by the Secretariat, has now made a preliminary evaluation of invasive plants potentially important for the EPPO region. It has distinguished between plants which are already present in many countries, where national measures are needed to suppress and contain them, and those which are only present in very few countries, so that limiting spread to other countries by internationally agreed measures is the major issue. A first categorization of terrestrial invasive plants is as follows:

National measures	**International measures**
Ambrosia artemisiifolia	*Ailanthus altissima*
Bidens frondosa	*Amelanchier spicata*
Fallopia japonica and related species	*Cyperus esculentus*
Helianthus tuberosus	*Heracleum sosnowskyi*
Heracleum mantegazzianum	*Panicum capillare*
Impatiens glandulifera	*Panicum dichotomiflorum*
Impatiens parviflora	*Senecio inaequidens*
Lupinus polyphyllus	*Solanum elaeagnifolium*
Prunus serotina	
Rhododendron ponticum	
Solidago canadensis	
Solidago gigantea	

A first categorization of aquatic invasive plants indicated that those considered are practically all of restricted distribution in the EPPO region, so that international measures are relevant. The Panel also stressed the greater immediate risk from these aquatic species:

Azolla filiculoides
Crassula helmsii
Elodea nuttallii
Hydrocotyle ranunculoides
Lagarosiphon major
Lemna minuta and *L. turionifera*
Ludwigia peploides and L. uruguayensis
Myriophyllum aquaticum

Since the first lists included few species of special concern for Mediterranean countries, the Panel will concentrate its further analysis on that region. All the above species will be subjected to PRA, with a view to proposing specific EPPO-recommended measures. As a first step, *Crassula helmsii* and *Hydrocotyle ranunculoides* are added to the EPPO Alert List.

Source: **EPPO Panel on Invasive Alien Species, 2004-03.**

Additional key words: invasive plants

2004/041 North American prairie plants proposed for use in the EPPO region

In North America, nurseries propose to park-keepers and gardeners a series of prairie plants which can be grown as mixtures, reconstituting the prairie plant communities which have to a large extent disappeared. Parks and gardens can thus contain 'wild' or 'native plant' sections which conserve and popularize these species. These plants are now also offered for sale in Europe, and the EPPO Panel on Invasive Alien Species is concerned about them for two main reasons:

1) some are close relatives of known invasive plants (*Aster, Solidago*)

2) most are proposed as easy-to-maintain garden plants, persistent and competitive (in other words potentially invasive)

A pest risk assessment was conducted on one pilot case: *Solidago nemoralis*, the grey golden rod. The conclusion was that this is a potentially invasive plant in Europe and it is undesirable that it should be widely planted and used. This species has been placed on the EPPO Alert List, and further measures will be considered.

Source: **EPPO Panel on Invasive Alien Species, 2004-03.**

Additional key words: invasive plants **Computer codes:** SOONE

2004/042 Addition of invasive plant species to the EPPO Alert List: *Crassula helmsii*, *Hydrocotyle ranunculoides* and *Solidago nemoralis*

As explained above (EPPO RS 2004/040 and 2004/041), the EPPO Panel on Invasive Alien Species has considered that the following plant species should be added to the EPPO Alert List.

Crassula helmsii (Crassulaceae – Australian swamp stonecrop or New Zealand pygmyweed)

Why	The EPPO Panel on Invasive Alien Species made a first categorization of aquatic invasive plants and considered that *Crassula helmsii* should be added to the EPPO Alert List.
Description	*C. helmsii* is an aquatic or semi-terrestrial perennial, with round stems of 10-130 cm length, floating or creeping (with roots forming at the nodes). Leaves are opposite, sessile and succulent (4-20 mm long, 0.7-1.6 mm wide). White or pinkish flowers are borne solitary in the axils of leaves (diameter 3-3.5 mm). Flowers appear in Europe between July and September. Fruits contain 2 to 5 elliptical and smooth seeds (0.5 mm long). In UK, *C. helmsii* produces flowers but no viable seeds. Pictures can be viewed on Internet: http://www.btinternet.com/~shsol/invasiveweeds/crassula.htm http://www.bioimages.org.uk/HTML/P30169.HTM
Where	*C. helmsii* originates from Australia and New Zealand. It has been introduced intentionally into Europe (as an aquarium plant), and the main problems are so far reported from the British Isles. **EPPO region**: Belgium (no details), France (mentioned as a new taxon in a list of plant species present, but no further details could be found), Germany (first reported in the early

1980s, now found locally in Hessen, Mecklenburg-Vorpommern, Niedersachsen, Nordrhein-Westfalen, Rheinland-Pfalz, Schleswig-Holstein), Netherlands (first found in 1995 and 1996 in a nature reserve near Breda), Portugal (its presence has been reported, but apparently not as an invasive), Russia (reported in the Baikal region), Spain (its presence has been reported, but so far not as an invasive), United Kingdom (first found in the 1950s in Greensted Pond, Essex and it then spread ; now present over 650 sites in the British Isles from sea level to 278 m, including Alderney (first noted in 1986), Guernsey (1989) and Northern Ireland (1984, in a pool at Gosford)).

North America: USA (South-eastern part). In some States, *C. helmsii* is subjected to regulations.

Oceania: Australia, New Zealand.

Habitat

Wetlands, slow-flowing or standing freshwater (e.g. ponds, lakes, reservoirs, canals, ditches). It can grow in a variety of different aquatic habitats (acid to alkaline waters, even in semi-saline sites). It can grown on damp ground and in water down to depths of 3 m.

In its native range, it can stand a wide range of climatic variations: mean temperatures from 30°C in summer to –6°C in winter, precipitation levels from 0.1-0.55 m in summer (November-April) to 0.2 – 3 m in winter (May-October).

Damage

Vegetative growth leads to dense mats that outcompete the native flora. *C. helmsii* presents vigorous growth through most of the year, without any period of die-back in winter. It can block ponds and drainage ditches. It impoverishes the ecosystem for invertebrates and fish. The mats can be dangerous to pets, livestock and children who mistake them for dry land.

Dispersal

Local dispersal is mainly ensured by vegetative reproduction. Small fragments (as small as a single node on 10 mm of stem) can produce new plants. These small fragments are readily transported with water, mud, or by wildlife to new sites. In addition, asexual reproduction is achieved via the production in autumn (in UK) of short shoots with very short internodes, known as turions. These are produced apically, and float or are blown around the water surface. These turions appear to be very effective at colonizing new areas. At least in UK, *C. helmsii* produces flowers but no viable seeds. So apparently in Europe, sexual reproduction does not play a role in plant multiplication and dissemination. Over long distances, trade of *C. helmsii* can obviously disseminate this species.

Pathway

Plants for planting of *C. helmsii* (soil/water containing viable plant fragments or seeds?).

Possible risks

Control is very difficult (mechanical control should be avoided as it produces more fragments which are able to disseminate the plant, herbicides (e.g. diquat) are available but their use in the natural environment might be difficult, the use of dark shading material is reported as a possibility in certain circumstances). At least in UK, *C. helmsii* has shown a high potential for invasiveness. Further spread of this species should be avoided.

Source(s)

Brouwer, E.; Den Hartog, C. (1996) *Crassula helmsii* (Kirk) Cockayne, an adventive species on temporarily exposed sandy banks. Gorteria. 22(6), 149-152.

Dawson, F.H.; Caffrey, J.M. (ed.); Barrett, P.R.F. (ed.); Murphy, K.J. (ed.); Wade, P.M. (1996) *Crassula helmsii*: attempts at elimination using herbicides. Management and ecology of freshwater plants. Proceedings of the 9th international symposium on aquatic weeds, European Weed Research Society, Dublin, Irish Republic, 1994. Hydrobiologia, 340(1/3), 241-245.

Dawson, F.H.; Waal, L.C. de (ed.); Child, L.E. (ed.); Wade P.M. (ed.); Brock, J.H. (1994) Spread of *Crassula helmsii* in Britain. In: Ecology and management of invasive riverside plants, 1-14. John Wiley & Sons Ltd; Chichester; UK

Dawson, F.H.; Warman, E.A. (1987) *Crassula helmsii* (T. Kirk) Cockayne: is it an aggressive alien aquatic plant in Britain? Biological-Conservation. 1987, 42(4), 247-272.

Weber, E. (2003) Invasive plant species of the world. A reference guide to environmental weeds. CABI Publishing, UK, 548 pp.

INTERNET

Alien Plants Ecology in Spain. Plant invaders in Spain (check-list). 'The unwanted citizens' by Dana, E.D.; Sanz-Elorza, M.; Sobrino, E. http://www.ual.es/personal/edana/alienplants/

Centre for Ecology and Hydrology Dorset, UK. *Crassula helmsii*. Focus on control – an update. http://dorset.ceh.ac.uk/River_Ecology/Botany_Research/Botany_Research_Pictures/Crassula_Helmsii.pdf

Flora of Northern Ireland. http://www.habitas.org.uk/flora/species.asp?item=4639

German Centre for Documentation and Information in Agriculture (ZADI). A map showing the distribution of *C. helmsii* in Germany. http://gis.zadi.de/scripts/esrimap.dll?name=florkart&cmd=mapflor&app=distflor&ly=gw&taxnr=6731

INRA Web Site. Index synonymique de la flore de France par Michel Kerguélen. http://www.inra.fr/flore-france/index.htm
Invasive Non-Native Species in the UK. University of Liverpool. The Invasive Alien Species Project. Fact Sheet: 1. Invasive Alien Aquatic Plant Species. *Crassula helmsii* (Kirk) Cockayne, Australian Swamp Stonecrop by Dr Jon Huckle, 19th February 2002. http://www.appliedvegetationdynamics.co.uk/IAAPwebsite/FactSheet/Crassula.doc
Invasive weeds. *Crassula helmsii*: an unwelcome invader by Jason Leach and Hugh Dawson. http://www.btinternet.com/~shsol/invasiveweeds/crassula/BRITWILD.DOC

EPPO RS 2004/042
Panel review date - Entry date 2004-04

Hydrocotyle ranunculoides (Apiaceae – floating (marsh) pennywort)

Why: The EPPO Panel on Invasive Alien Species made a first categorization of aquatic invasive plants and considered that *Hydrocotyle ranunculoides* should be added to the EPPO Alert List.

Description: *H. ranunculoides* is a stoloniferous, perennial, aquatic plant, with floating and emergent leaves. It is rooting in the shallow margins of slow flowing waters. It has round-reniform leaves (diameter 2-6 cm), with 3-7 lobes (lobe divisions extend to about mid-leaf). Long petioles (5-35 cm) are attached to leaf edge (although they appear to be attached to the centre of the leaf). It has small white, greenish or yellow flowers (umbels) arising from the leaf base (each flower has 5 tiny petals). In North America, it flowers during July and October. Fruit is 1-3 mm long, elliptic to round, and flattened with faint ribs. Many fibrous roots emerge from the stems at the nodes. In Europe, can be confused with the native *H. vulgaris*.
Pictures can be viewed on Internet:
http://www.habitas.org.uk/gardenflora/hydrocotyle_ranunculoides.htm
http://www.btinternet.com/~shsol/invasiveweeds/hydrocotyle.htm

Where: *H. ranunculoides* is a native of North America, and has become naturalized in Central and South America.
EPPO region: Netherlands (first found in waterways in summer 1995, it is suspected that it escaped from garden ponds. Since then, its range rapidly expanded, and it is now considered that it will be very difficult to stop its spread), United Kingdom (first recorded as naturalised in the south east in the 1980s. Introduced by the aquatic nursery trade for tropical aquaria and garden ponds, by 2001 it was recorded at 71 sites, mainly in the south of England and south Wales, but it expands in northwest England). It is reported to occur in Portugal and Italy. According to van der Krabben and Rotteveel (2003), it also occurs in Belgium and France. In the Netherlands, it is now prohibited to sell and possess *H. ranunculoides*.
North America: Canada, USA (Alabama, Arizona, Arkansas, California, Delaware, Florida, Georgia, Illinois, Kansas, Louisiana, Maryland, Mississippi, New Jersey, New York, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, South Carolina, Tennessee, Texas, Virginia, Washington, West Virginia). In some States (Illinois, New Jersey, New York) it is considered as an endangered species.
South and Central America: Argentina, Bolivia , Brazil, Chile, Costa Rica. It is probably present in other countries but data is lacking.
Africa: Zimbabwe.
Oceania: Australia (Western Australia). First found in 1983, and measures are taken to eradicate it and prevent any further spread.

Habitat: *H. ranunculoides* can be found in slow-flowing water bodies, particularly ditches, dykes, lakes and ponds. Growth is more abundant on eutrophic sites with high organic matter availability.

Damage: *H. ranunculoides* forms dense interwoven mats of vegetation which can quickly cover the water surface. Plants die back in winter, but shoots and roots survive in the bank and wet ground, and then quickly grow into new plants in spring. In UK conditions, mats of

vegetation have been observed to grown up to 15 m from the bank in a single season (so approximately 20 cm per day). Leaf matter extends up to 40 cm above the water surface and the interwoven mat of roots and stems can sink up to 50 cm into the water. *H. ranunculoides* outcompetes other plants species. Its dense mats of vegetation pose a problem for recreational users and may have a negative impact on the ecosystem (lower light penetration to the water, oxygen shortage, higher risks of flooding).

Dispersal — Local dispersal is ensured by rooting at nodes, root and stem fragments, and seeds. Fragments of plants can be transported with flowing water to new sites. Waterfowl are also able to spread plant fragments. Over long distance, trade of plants for aquaria and garden ponds can disseminate *H. ranunculoides*.

Pathway — Plants for planting of *H. ranunculoides*, (soil/water containing viable plant fragments or seeds?).

Possible risks — Control is very difficult. Several methods can be used but none is fully effective. As *H. ranunculoides* forms very thick mats, it is usually recommended to remove plants mechanically before applying herbicides (diquat, 2,4-D amine, MCPA). Shading with dark material may be a possibility, as well as netting to reduce spread. At least in UK and the Netherlands, *H. ranunculoides* has shown a high potential for invasiveness. Further spread of this species should be avoided.

Source(s)

Baas, W.J.; Duistermaat, L.H (1999) The invasion of floating pennywort (*Hydrocotyle ranunculoides* L.f.) in the Netherlands, 1996-1998. Gorteria, 25(4), 77-82.

Chikwenhere, G.P.; Julien, M.H. (ed.); Hill, M.P. (ed.); Center, T.D. (ed.); Ding-Jianqing (2001) Current strategies for the management of water hyacinth on the Manyame River System in Zimbabwe. Biological and integrated control of water hyacinth: *Eichhornia crassipes*. Proceedings of the Second Meeting of the Global Working Group for the Biological and Integrated Control of Water Hyacinth, Beijing, China, 9-12 October 2000, 105-108.

Ferreira, A.G.; Souto, C.F.M.; Goidanich, V.; Lipp J.K.; Del Pino, R. (1981) Density, position and dimensions of stomata of plants occurring at Taim Ecological Station, RS, Brazil. Anais do 32 Congresso Nacional de Botanica, Teresina, Brazil, January 1981, 229-232.

Krabben, K.P.M. van der, Rotteveel, A.J.M. (2003) Draft Report of a pest risk assessment of *Hydrocotyle ranunculoides*. Unpublished document.

Lallana, V.H.; Barrett, P.R.F. (ed.); Greaves, M.P. (ed.); Murphy, K.J. (ed.); Pieterse, A.H. (ed.); Wade, P.M. (ed.); Wallsten, M. (1990) Dispersal units in aquatic environments of the middle Parana River and its tributary, the Saladillo River. Proceedings of the 8th international symposium on aquatic weeds, Uppsala, Sweden, 13-17 August 1990, 151-159.

INTERNET

Checklist of dicotyledonous species associated with Bolivian wetlands by Dr Nur Ritter, University of Fresno (US). http://www.botanize.com/bol_checklist/dicots.html

Invasive Non-Native Species in the UK. University of Liverpool. The Invasive Alien Species Project. Fact Sheet: 2. Invasive Alien Aquatic Plant Species. *Hydrocotyle ranunculoides* (L.f.), Floating Pennywort by Dr Jon Huckle, 19th February 2002.
http://www.appliedvegetationdynamics.co.uk/IAAPwebsite/FactSheet/Hydrocotyl.doc

Instituto Nacional de Biodiversidad (Costa Rica). Lista de especímenes de *Hydrocotyle ranunculoides*. http://www.inbio.ac.cr/bims/k03/p13/c045/o0135/f01665/g006947/s019969.htm

Palma, B.; San Martín, C.; Rosales, M.; Zúñiga, Ramírez, C. (1986) Distribución espacial de la flora y vegetación acuática y palustre del estero marga-marga en Chile central. http://biblioweb.dgsca.unam.mx/cienciasdelmar/instituto/1987-2/articulo269.html

USDA Natural Resources Conservation Service. Plant Profile. *Hydrocotyle ranunculoides*. http://plants.usda.gov

Wageningen University. Environmental Science. Aquatic Ecology and Water Quality Management Group. Invasion of Dutch waters by floating pennywort (*Hydrocotyle ranunculoides*) ('Grote Waternavel'). http://www.dow.wau.nl/aew/Projects/info_waternavel.html

EPPO RS 2004/042
Panel review date - Entry date 2004-04

Solidago nemoralis (Asteraceae – Gray goldenrod)

Why	The EPPO Panel on Invasive Alien Species made a first categorization of alien invasive plants. As *Solidago nemoralis* is currently advertised for landscaping purposes in Europe without any thorough analysis of its potential invasiveness, the Panel felt that it should be added to the EPPO Alert List.
Description	*S. nemoralis* is a perennial, slender plant (0.3-0.5 m tall). Leaves are alternate. Basal and rosette leaves are long, oval, and tapered at base with serrations on the distal half. Stalk leaves are oval and tapered at both ends. All leaves have distinct midrib and web-like venation. The inflorescence is a cluster of yellow flowers all growing on one side of the stalk. In North America, it flowers in August-September. Achenes then develop with tufts of hair and are dispersed by the wind. Pictures can be viewed : http://www.indiana.edu/~preserve/nature/floral_inventory/pages/sol_nem.htm http://www.shout.net/~jhilty/plantx/fld_goldenrodx.htm
Where	N**orth America**: Canada, USA (Alabama, Arkansas, Connecticut, Delaware, Illinois, Indiana, Iowa, Kansas, Maine, Maryland, Massachusetts, Michigan, Missouri, New Hampshire, New Jersey, New York, Ohio, Oklahoma, Pennsylvania, Rhode Island, Texas, Vermont, Virginia, West Virginia).
Habitat	Prairies (growing on black soil, gravel, sand), dry and sandy fields, sandy roadsides, railroads, dunes, *Quercus velutina* savannas, eroded clay banks, abandoned fields.
Damage	In some Western states in USA, it is considered as a troublesome weed. Chemical treatments are mentioned in the literature in apple orchards, pastures, and soybean fields. In the USA, no environmental or social impact is mentioned. In its native range *S. nemoralis* is not considered as a noxious weed or invasive species. Data is lacking on possible hybridization with other *Solidago* species. However, *S. nemoralis* shares some similiarities with other *Solidago* species which are invasive in Europe (e.g. *S. canadensis*, *S. gigantea*). It is reported that, at suitable locations, *S. nemoralis* has a tendency to form colonies. It survives in difficult locations (slopes, poor soil) where little else will grow. It produces large number of highly viable seeds and vegetative spread is considered as rapid. It can stand low temperatures (-30C°).
Dispersal	Local dispersal is mainly ensured by seeds. Plants can also be spread by rhizomes when soil or plants are disposed of. Over long distances, trade of plants and seeds can disseminate *S. nemoralis*.
Pathway	Plants for planting, seeds of *S. nemoralis* (soil with viable rhizomes or seeds?).
Possible risks	It shares characteristics with other *Solidago* species which are invasive in Europe and in other parts of the world. Control methods are available (herbicides, mowing) but may be difficult to apply in natural or semi-natural environments. This plant is planned to be planted in Europe in public spaces, motorway verges, embankments for landscaping purposes. Considering its high seed production, rapid seed spread and vegetative spread, it could present a risk to the EPPO region as it could outcompete native species including endangered species (e.g. in natural grasslands competing with orchids). However, more data is needed on possible habitats at risk in Europe, and plant biology. Introduction of this species for landscaping purpose should be avoided, native species or alien plants with no history of invasiveness in Europe should be substituted for it.

Source(s)

Kapusta, G.; Krausz, R.F. (1993) Weed control and yields are equal in conventional, reduced-, and no-tillage soybean (*Glycine max*) after 11 years. Weed-Technology, 7(2), 443-451.

Peters, E.J. (1983) Effectiveness and safety of translocated herbicides applied to pasture weeds with a rope-wick applicator. Proceedings of the XIV International Grassland Congress, held at Lexington, Kentucky, U.S.A., June 15-24, 1981 [Smith, J.A.; Hays, V.W. (Editors)], 553-555.

Peters, E.J.; Lowance, S.A. (1978) Effects of multiple mowing on western ironweed (*Vernonia baldwinii*) and gray goldenrod (*Solidago nemoralis*). Weed-Science, 26(2), 190-192.

Schrader, G., Baker, R. (2003) Draft Report of a pest risk assessment of *Solidago nemoralis*. Unpublished document.

Weller, S.C. (1984) Post-emergence weed control in orchards. Proceedings, North Central Weed Control Conference, Vol.39, p 145.

INTERNET
Prairie Wildflowers of Illinois. Field Goldenrod – *Solidago nemoralis*. http://www.shout.net/~jhilty/plantx/fld_goldenrodx.htm
USDA Natural Resources Conservation Service. Plant Profile. *Solidago nemoralis*. http://plants.usda.gov/cgi_bin/plant_profile.cgi?symbol=SONEN
USDA Natural Resources Conservation Service. Conservation Plant Characteristics for *Solidago nemoralis*. http://plants.usda.gov/cgi_bin/plant_attribute.cgi?symbol=SONE

EPPO RS 2004/042
Panel review date - Entry date 2004-04

2004/043 Finding of *Clavibacter michiganensis* subsp. *sepedonicus* on ware potatoes in Austria

The NPPO of Austria recently informed the EPPO Secretariat that *Clavibacter michiganensis* subsp. *sepedonicus* (EPPO A2 list) was detected during the annual monitoring programme on a lot of ware potatoes (*Solanum tuberosum* cv. Agria) in the east of Niederösterreich. The occurrence of the bacterium was officially confirmed. Detection was done in accordance with EU Directive 93/85 EEC. Investigations showed that this lot had originally been produced from certified German seed potatoes. The German authorities have been informed. All necessary measures according to EU Directive 93/85 EEC were implemented by the Austrian NPPO. In particular, a safety zone was established, covering the whole farm where the potatoes grew, and all potatoes grown in 2003 on this farm were destroyed under official supervision. In addition, attempts were made to trace back all seed lots which had been sold to Austrian farmers with the same plant passport from Germany. No other positive findings were made.
The declared status of *Clavibacter michiganensis* subsp. *sepedonicus* in Austria is: **Present, found in a limited area on ware potatoes, under eradication**.

Source: **NPPO of Austria, 2004-03.**

Additional key words: detailed record **Computer codes:** CORBSE

2004/044 *Clavibacter michiganensis* subsp. *sepedonicus* found in Finland

Potato ring rot caused by *Clavibacter michiganensis* subsp. *sepedonicus* (EPPO A2 list) has been found in Finland, during the period October 2003 to February 2004, on four farms producing ware potatoes. The following potato lots were found infested: *Solanum tuberosum* cv. Matilda (3 lots – 8.82 ha), Van Gogh (1 lot, 3.26 ha), Fambo (1 ha), Asterix and Van Gogh (1 lot, 0.31 ha) and Matilda (1 lot, 0.06 ha).
These findings were made during investigations done to trace back infestations which had been found during market control. These investigations are continuing to identify farms which have used the same seed potato clones which were found infected in the four farms concerned.
Official phytosanitary measures are taken according to EU Directive 93/85/EEC and the Decision of the Ministry of Agriculture and Forestry 100/95.
The situation of *Clavibacter michiganensis* subsp. *sepedonicus* in Finland can be described as follows: **Present, found on ware potatoes in a limited number of farms, under eradication.**

Source: **NPPO of Finland, 2004-03.**

Additional key words: detailed record **Computer codes:** CORBSE, FI

2004/045 USA officially declare the absence of *Potato spindle tuber pospiviroid* in seed potato production

In USA, at a meeting on potato certification held in 1998, it was reported that *Potato spindle tuber pospiviroid* (PSTVd - EPPO A2 list) had not been detected in seed potato stocks for the last 10 years. Based on this information, fourteen seed potato certification agencies (Alaska, California, Colorado, Idaho, Maine, Michigan, Minnesota, Montana, Nebraska, New York, North Dakota, Oregon, Washington, and Wisconsin) surveyed all seed-potato growing areas for the presence of PSTVd. The survey included general surveillance which involved searching for the occurrence of PSTVd in state seed-potato certification records from 1990 through 2000, and a specific field survey which involved testing selected crops for PSTVd infection by nucleic acid-dot-blot hybridization during 1999-2001. No PSTVd incidents were documented in any of the state certification records, nor was PSTVd detected in the field surveys. Seed-potato certification agencies routinely test seed-potato stocks for PSTVd at a number of certification levels starting with pre-nuclear in tissue culture, continuing with field-increased seed generations during the growing season and ending with post-harvest grow-out plots. Based on these surveys, PSTVd is now considered as absent from all seed-potato growing areas of USA. The situation of PSTVd in USA can be described as follows: **Absent from seed-potato stocks, no longer found, confirmed by surveys on seed potato production.**

Source: **NAPPO Pest Alert**
Official Pest Reports - Absence of Potato Spindle Tuber Viroid (PSTVd) in the United States (2004-03-04). http://www.pestalert.org

Additional key words: absence **Computer codes:** PSTVD0, US

2004/046 Molecular hybridization technique to detect *Potato spindle tuber pospiviroid*

A molecular hybridization technique has been developed in France to detect *Potato spindle tuber pospiviroid* (PSTVd - EPPO A2 list) in fresh or lyophilized extracts obtained from samples of potato leaves or germs. This method was tested and compared with reverse PAGE and RT-PCR and was found highly sensitive and reliable. It is concluded that this method is a suitable tool for official surveys on PSTVd.

Source: Ollivier, F. (2004) L'hybridation moléculaire: une technique de détection du *Potato spindle tuber viroid* adaptée aux plans de surveillance.
Bulletin OEPP/EPPO Bulletin, 34(1), 123-126.

Additional key words: diagnostics **Computer codes:** PSTVD0

2004/047 First report of *Thrips palmi* in Mexico

At the beginning of March 2004, the presence of *Thrips palmi* (Thysanoptera: Thripidae – EPPO A1 list) was detected on watermelon (*Citrullus lanatus*) in the municipality of Campeche (state of Campeche) in Mexico. Surveys are being carried out to delimit the extent of the infestation, and phytosanitary measures are applied to eradicate the pest. According to the EPPO Secretariat this is the first report of *T. palmi* in Mexico.
The situation of *T. palmi* in Mexico can be described as follows: **Present, reported for the first time in 2004, in the municipality of Campeche (state of Campeche).**

Source: **NAPPO Pest Alert.**
Detección de Trips oriental (*Thrips palmi* Karny), en el municipio Campeche, Campeche, México. News Stories (2004-04-21).
http://www.pestalert.org

Additional key words: new record **Computer codes:** THRIPL, MX

2004/048 Introduction of *Bactrocera cucurbitae* in the Seychelles and eradication programme

In November 1999, the presence of *Bactrocera cucurbitae* (Diptera: Tephritidae – EPPO A1 list) was first observed on Mahé Island in the Seychelles. It is suspected that the melon fly was introduced by an aircraft meal containing fresh fruits and vegetables which had not been properly disposed of at the International airport. The melon fly soon became established on Mahé Island and spread to other islands of the archipelago. An eradication programme has been set up. A trapping network is being established on the basis of a 1 km² grid, with one trap placed in the centre of each unit, to delimit the extent of the infestation. These traps contain a parapheromone and an insecticide. This trapping phase will be followed by an eradication phase using the male annihilation technique with blocks of wood soaked in methyl eugenol and insecticide. The eradication campaign will start at the beginning of the dry season in April 2004. According to the EPPO Secretariat this is the first report of *B. cucurbitae* in the Seychelles.
The situation of *B. cucurbitae* in the Seychelles can be described as follows: **Present, first found in 1999, under eradication.**

Source: Knight, J. (2003) Trouble in paradise – the eradication of an alien invader.
AAB News, no. 52, 89

Additional key words: new record **Computer codes:** DACUCU, SC

2004/049 Situation of *Paysandisia archon* in Spain

In Spain, *Paysandisia archon* (Lepidoptera, Castniidae – EPPO Alert List) was first reported at the beginning of 2001, in the province of Girona, Cataluña. It then expanded to several sites along the Mediterranean coast (from the province of Girona down to the province of Alicante) causing damage to various palm species. In Comunidad Valenciana, *P. archon* was found on 3 sites in the province of Castellón, on 2 sites in the province of Alicante and a few sites in the province of Valencia (in urban areas), damaging *Phoenix canariensis*, *Chamaerops humilis*, *Trachycarpus fortunei* and *Washingtonia filifera*. In this paper details are given about the biology of *P. archon*, its host plants and geographical distribution. In its area of origin, *P. archon* is reported in Argentina (north-west), Paraguay, Uruguay (west), and Brazil (south). Concerning host plants, it is noted that in France where the pest has also been introduced (in Var and Hérault departments), damage has been observed on the following palm species: *Thritrinax campestris*, *Chamaerops humilis*, *Livistona chinensis*, *L. decipiens*, *L. saribus*, *Sabal*, *Phoenix canariensis*, *P. dactylifera*, *P. reclinata*, *Trachycarpus fortunei*, and *Washingtonia filifera*.

Source: Montagud Alario, S.; Rodrigo Coll, I. (2004) *Paysandisia archon* (Burmeister, 1880) (Lepidoptera, Castniidae): nueva plaga de palmáceas en expansión. **Phytoma España, no. 157, 40-53.**

Additional key words: detailed record **Computer codes:** PAYSAR, ES

2004/050 Details on the situation of *Spodoptera littoralis* in Italy

In Italy, the first significant outbreaks of *Spodoptera littoralis* (Lepidoptera: Noctuidae – EPPO A2 list) were reported in 1968, near Ragusa in Sicilia. For the next 20 years, the pest remained confined to limited areas, but it then started to spread within the south of Italy (Mezzogiorno) and costal areas. Today, it is considered that it has invaded the main horticultural regions, especially in southern Italy. It has encountered favourable conditions in many coastal areas where agriculture is intensive and frequently conducted in protected environments. So far, serious outbreaks on vegetable and ornamentals crops have been observed in: Basilicata, Calabria, Campania, Lazio, Liguria, Molise, Puglia, Sicilia. Although, *S. littoralis* larval populations are naturally controlled by nuclear polyhedrosis virus, there is a general lack of predators or parasitoids. Other factors such as: increase of protected crops, low susceptibility or resistance of larvae to conventional chemical treatments, excessive use of fertilizers and the biological characteristics of *S. littoralis* (high reproductive potential, high mobility of adults, polyphagy…) have contributed to its dispersal in Italy. Eradication of *S. littoralis* is not considered feasible and further studies on appropriate control strategies are needed.

Source: Sannino, L. (2003) *Spodoptera littoralis* in Italia: possibili ragioni della crescente diffusione e mezzi di lotta.
Informatore Fitopatologico, no. 6, 28-31.

Additional key words: detailed record **Computer codes:** SPODLI, IT

2004/051 Studies on the efficacy of methyl iodide against forest insect pests

Studies on alternative fumigants to methyl bromide are being carried out in Japan. The efficacy of methyl iodide was tested for several forest insect pests: *Callidiellum rufipenne* (EPPO Alert List), *Monochamus alternatus* (EPPO A1 list), *Semanotus japonicus, Cryphalus fulvus, Ips subelongatus* (EU Annexes), *Xyleborus pfeili, Pissodes nitidus, Shirahoshizo rufescens*. Various stages of these species (under bark, in xylem or in artificial diet) were fumigated with methyl iodide at doses of 5, 10 , 15 , 30 and 50 g m^{-3} for 24 hours at 15°C. All eggs of *C. rufipenne, S. japonicus, C. fulvus, X. pfeili, P. nitidus* were killed at 10 g m^{-3}. 100 % mortality for larval and pupal stages under bark and in xylem (or in artificial diet) was obtained at 30 g m^{-3}, except for *C. rufipenne, M. alternatus* and *S. rufescens*. At 50 g m^{-3}, all stages of the tested species were killed, except *C. rufipenne* larvae in xylem (95.5 % mortality). It was concluded that although further experiments are needed, methyl iodide appears as a promising tool to eliminate pests in imported wood.

Source: Naito, H.; Goto, M.; Ogawa, N.; Soma, Y.; Kawakami, F. (2003) Effects of methyl iodide on mortality of forest insect pests.
Research Bulletin of the Plant Protection Service, Japan, no. 39, 1-6.

Additional key words: quarantine treatments **Computer codes:** CLLLRU, MONCAL IPSXCE, JP

2004/052 New canker disease of pear in Italy: addition of *Valsa ceratosperma* to the EPPO Alert List

The NPPO of Italy informed the EPPO Secretariat of the presence of a new canker disease of pear in Emilia-Romagna caused by *Valsa ceratosperma* (Ascomycetes: Diaporthales). In 2001, this new canker disease was observed on a limited number of old pear trees (30-40 years old), in 3 orchards in Emilia-Romagna (1 in the province of Modena, 2 in Ferrara). Laboratory analysis revealed the presence of *Valsa ceratosperma* [anamorph *Cytospora vitis* (=*C. sacculus*)]. In 2002 and 2003, the disease was observed on a larger number of trees in the provinces of Modena, Ferrara and Bologna. *V. ceratosperma* was not only found on old trees, but also on young productive trees (from 8 years-old). In some orchards, cankers were observed on 70% of the trees. In these orchards as heavy pruning was needed to contain the disease, crop losses were observed. Surveys have been conducted in nurseries on certified and CAC multiplication material, but so far *V. ceratosperma* has not been found. According to the literature, this is the first report of *V. ceratosperma* causing canker disease on pear in Italy and in Europe. Finally, the EPPO Panel on Phytosanitary Measures considered that this fungus should be added to the EPPO Alert List. The situation of *V. ceratosperma* in Italy can

be described as follows: **Present, found in Emilia-Romagna (provinces of Bologna, Ferrara and Modena) at low prevalence and subject to containment measures.**

*Valsa ceratosperma (*a new canker disease of pear)

Why	The presence of a new canker disease of pear caused be *Valsa ceratosperma* was reported by Italy, and the EPPO Panel on Phytosanitary Measures considered that this fungus should be added to the EPPO Alert List.
Where	**EPPO region:** Italy (Emilia-Romagna). In Italy containment measures are taken to prevent any further spread. **Asia**: China, Japan and Korea
Note:	The IMI description of *V. ceratosperma* (no. 1366, 1998) gives a much broader distribution. However, the disease it cause on pear, apple and quince has only been observed in the Asian countries mentioned above and now in Italy.
On which plants	*Cydonia oblonga, Malus domestica, Pyrus communis*. In Asia, *Valsa* canker is mainly reported on apple, and occasionally on pear and quince. In Italy, it was only found on pear. (cv. Abate Fétel was the most affected, but other cultivars (i.e. William, Decana, Kaiser, Passecrassane, Morettini, General Leclerc) were also found susceptible).
Damage	The fungus causes elongated cankers on twigs, branches and trunks. Symptoms can easily be confused with other pathogens such as: *Nectria galligena, Sphaeropsis malorum, Phomopsis mali* and *Erwinia amylovora*. When cankers develop, they can girdle twigs, branches and even trunks, which then lead to desiccation and death of the distal part. *V. ceratosperma* overwinters in infected wood and plant debris, and most new lesions appear in spring. The affected bark is swollen, watersoaked, and in February small dark pycnidia can be observed. In spring, under humid conditions, pycnidia release spores which are responsible for new infection. The fungus penetrate through natural bark crevices and wounds (due to adverse climatic conditions or pruning). Ascospores are also formed in autumn/winter but it seems that they only play a secondary role in disease spread. In the literature, it is mentioned that on apple, the disease may remain latent for 1 to 3 years.
Dissemination	Within orchards, disease spread is ensured by the production of pycnidiospores in spring and to a lesser extent by ascospores in autumn/winter. Over long distances, trade of plants and eventually of wood can ensure dispersal of *V. ceratosperma*.
Pathway	Plants for planting, wood of *Cydonia*, *Malus* and *Pyrus* from countries where *V. ceratosperma* occurs.
Possible risks	Fruit crops such as pear, apple and quince are important for the EPPO region. Control of canker diseases is usually difficult in practice. Mechanical removal of cankers is a possibility, and data is currently lacking on chemical products which may be effective against *V. ceratosperma*. In Italy, high incidence in affected orchards and crop losses are already observed. Therefore, any further spread of this disease should be avoided.
Source(s)	Agricoltura, February 2003. Il “cancro da Valsa”, nuova malattia del pero. Carla Montuschi, Servizio Fitosanitario, Regione Emilia-Romagna http://www.regione.emilia-romagna.it/agricoltura/rivista/2003/02/ra030266.pdf Servizio Fitosanitario Emilia-Romagna Un nuovo agente di cancri rameali su pero Il “Cancro da Valsa”, malattia accertata per la prima volta nella nostra regione nel 2001, è in corso di studio da parte del Servizio fitosanitario regionale. di Carla Montuschi, Servizio Fitosanitario, Regione Emilia-Romagna http://www.agrimodena.it/pere/cancrodavalsa.html Cancro da Valsa - *Valsa ceratosperma* (Tode:Fr.) Maire (f. con. *Cytospora vitis* Mont.). http://www.regione.emilia-romagna.it/fitosanitar/avversita/primo_piano/valsa/valsa.htm IMI (1998) Descriptions of fungi and bacteria no.1366. *Valsa ceratosperma*. CABI, Wallingford, UK. NPPO of Italy, 2004-03.

EPPO RS 2004/052
Panel review date - Entry date 2004-04

2004/053 New data on *Phytophthora ramorum*

The EPPO Secretariat has extracted the following new data on *Phytophthora ramorum* (EPPO Alert List).

New findings in nurseries in USA

In California: *P. ramorum* was confirmed in a nursery (Monrovia nursery) in Los Angeles county, in March 2004. The presence of *P. ramorum* was unexpected because this nursery is not in the regulated area near any source of known infection, and the area is situated in a dry climate (previous detections of the organism have been confined to areas with a wet environment).

In Florida: *Phytophthora ramorum* (EPPO Alert List) was found in three nurseries. Plants had been imported from the nursery mentioned above in California.

In Georgia: *P. ramorum* was detected in five nurseries on Camellia plants which had also been imported from California. All infected plants will be destroyed (NAPPO Pest Alert).

New host plants

In May 2003, *P. ramorum* was isolated from leaflets of *Rosa gymnocarpa*, in California, US. Affected leaflets showed cream-to-brown lesions or spots, sometimes delimited by a chlorotic zone. The infected plants were found in a mixed forest where infected trees of *Sequoia sempervirens, Umbellularia californica* and *Lithocarpus densiflorus* were also present (Hüberli *et al.*, 2004).

Source: Hüberli, D.; Reuther, K.D.; Smith, A.; Swain, S.; Tse, J.G.; Garbelotto, M. (2004) First report of foliar infection of *Rosa gymnocarpa* by *Phytophthora ramorum*.
Plant Disease, 88(4), p 430.

NAPPO Pest Alert.
News Stories: Sudden Oak Death (*Phytophthora ramorum*) detected in five Georgia Nurseries & Sudden Oak Death (*Phytophthora ramorum*) discovered in three Florida nurseries (2004-04-14 & 2004-04-05)
Official Pest Reports - Sudden Oak Death Syndrome in California Nurseries (2004-03-17)
http://www.pestalert.org

Additional key words: new host plants, detailed records **Computer codes:** PHYTRA, US

2004/054 Canadian regulations for *Phytophthora ramorum*

The Canadian Food Agency is in the process of modifying its phytosanitary requirements in order to prevent the entry of *Phytophthora ramorum* (EPPO Alert List) into Canada. The present regulations on the import of host plants of *P. ramorum* are laid down in the Directive on "Phytosanitary Requirements to Prevent the Entry of *Phytophthora ramorum* Associated with Sudden Oak Death into Canada" dated 2003-09-25. On the basis of findings on new plant genera, Canada intends to increase the list of host plants covered these regulations to:

Castanea
Leucothoe
Pyracantha
Rosa
Rubus
Taxus

Source: **Personal communication with Ms R. Bast-Tjeerde, Canadian Food Agency, 2004-04.**
http://www.inspection.gc.ca/english/plaveg/protect/dir/d-01-01e.shtml

Additional key words: regulations **Computer codes:** PHYTRA

2004/055 EPPO report on notifications of non-compliance (detection of regulated pests)

The EPPO Secretariat has gathered the notifications of non-compliance for 2003 received since the previous report (EPPO RS 2004/018) from the following countries: France, Germany, Israel and Netherlands. When a consignment has been re-exported and the country of origin is unknown, the re-exporting country is indicated in brackets. When the occurrence of a pest in a given country is not known to the EPPO Secretariat, this is indicated by an asterisk (*).

The EPPO Secretariat has selected notifications of non-compliance made because of the detection of regulated pests. Other notifications of non-compliance due to prohibited commodities, missing or invalid certificates are not indicated. It must be pointed out that the report is only partial, as many EPPO countries have not yet sent their notifications.

Note: The EPPO RS 2004/018 mentioned the interception of *Spodoptera litura* in Dianthus cut flowers from Israel by the Netherlands. A correction should be made as the intercepted

organism was *Spodoptera littoralis* (*S. litura* is absent in the EPPO region). A revised notification has been sent to Israel.

Pest	Consignment	Type of commodity	Country of origin	C. of destination	nb
Acari, *Dysmicoccus, Haplothrips, Anisembia rubra, Pteropstichus madidus, Halimococcidae* (including species absent in Israel)	*Tillandsia*	Cuttings	Germany	Israel	1
Agromyzidae	*Ocimum basilicum*	Vegetables	Thailand	France	2
	Ocimum, O. sanctum	Vegetables	Thailand	France	1
Aleyrodidae	*Begonia*	Pot plants	Netherlands	Israel	1
	Ilex	Cut branches	France	France (French Guiana)	1
	Rosa	Cut flowers	Netherlands	France	1
Aphelenchoides fragariae	*Scilla*	Bulbs	Netherlands	Israel	1
Aphididae	*Alstroemeria*	Cut flowers	Netherlands	Israel	1
Bemisia tabaci	*Hygrophila corymbosa*	Aquarium plants	Indonesia	France	1
	Limnophila	Aquarium plants	Thailand	France	1
	Mentha	Vegetables	Morocco	France	2
	Ocimum basilicum	Vegetables	Morocco	France	1
	Solidago	Cut flowers	Israel	Netherlands	1
	Trachelium	Cut flowers	Israel	France	1
	Trachelium	Cut flowers	Israel	Netherlands	1
Cirsium arvense	*Allium schoenoprasum*	Seeds	Czech Republic	Israel	1
	Thymus capitatus	Seeds	Germany	Israel	1
***Cirsium arvense*, sclerotia**	*Petroselinum crispum*	Seeds	Denmark	Israel	1
Clavibacter michiganensis* subsp. *michiganensis	*Lycopersicon esculentum*	Seeds	China*	Germany	1
Cuscuta	*Coriandrum sativum*	Seeds	Italy	Israel	1
Diaspidiotus pernisiosus	*Cydonia sinensis*	Fruits	Turkey	Israel	1
Fusarium, Helminthosporium solani, Rhizoctonia solani, Spongospora subterranea	*Solanum tuberosum*	Seed potatoes	Scotland	Israel	1
Globodera	*Prunus cerasus*	Plants for planting	Poland	Netherlands	1
Helicoverpa armigera	*Eryngium*	Vegetables	Zimbabwe	Netherlands	1
	Phaseolus vulgaris	Vegetables	Egypt	Netherlands	1
	Pisum sativum	Vegetables	Egypt	Netherlands	2
	Pisum sativum	Vegetables	Kenya	Netherlands	3
	Pisum sativum	Vegetables	Zimbabwe	Netherlands	4
Hirschmanniella	*Hydrocharitaceae*	Aquarium plants	Indonesia	France	1
	Vallisneria	Aquarium plants	Indonesia	France	1
Lepidoptera	*Impatiens x novae-guinea*	Cuttings	Tunisia	France	1
***Mollusca* (snails)**	*Rhododendron simsii*	Pot plants	Netherlands	Israel	3

Pest	Consignment	Type of commodity	Country of origin	C. of destination	nb
Onychiurus armatus	*Pteris*	Plants for planting	Netherlands	Israel	1
Phytophthora ramorum	*Viburnum bodnantense*	Plants for planting	Netherlands	Germany	1
Polygonum convolvulus	*Lupinus*	Seeds	Netherlands	Israel	1
	Raphanus sativus	Seeds	Italy	Israel	1
	Spinacia oleracea	Seeds	Netherlands	Israel	1
Prune dwarf ilarvirus	*Rhododendron simsii*	Seeds	Germany	Israel	1
Psyllidae (*suspect *Psylla uncatoides)	*Mimosa*	Cut flowers	Netherlands	France	1
Radopholus	*Anubias hastifolia*	Aquarium plants	Spain (Canary isl.)	Germany	1
Radopholus similis	*Schefflera*	Plants for planting	Côte d'Ivoire	France	1
	Schefflera, Syngonium, Pothos	Plants for planting	Côte d'Ivoire	France	1
Thrips flavus	*Alstroemeria*	Cut flowers	Netherlands	Israel	1
Thysanoptera	*Momordica charantia*	Vegetables	Dominican Rep.	France	1
	Solanum melongena	Vegetables	Thailand	France	2
Tobamovirus	*Lycopersicon esculentum*	Seeds	China	Israel	1
Xanthomonas axonopodis* pv. *vesicatoria	*Capsicum annuum*	Seeds	Poland	Germany	1
Zonitoides arboreus	*Rhododendron simsii*	Pot plants	Netherlands	Israel	1
Zonitoides nitidus	*Rhododendron simsii*	Pot plants	Netherlands	Israel	1

- **Fruit flies**

Pest	Consignment	Country of origin	C. of destination	nb
Non-European *Tephritidae*	*Annona muricata*	Kenya	France	1
	Capsicum	Thailand	France	1
	Syzygium samarangense	Thailand	France	1

- **Wood**

Pest	Consignment	Type of commodity	Country of origin	C. of destination	nb
Cerambycidae	Unspecified wood	Packing wood	China	Germany	1
Grub holes > 3mm	Hardwood	Packing wood	China	Germany	1
Sinoxylon	Hardwood	Packing wood	Thailand	Germany	1
Sinoxylon anale	Unspecified wood	Packing wood	India	Germany	1

Source: EPPO Secretariat, 2004-03. NPPO of the Netherlands, 2004-03.

2004/056 BBCH Scales: Growth stages of mono-and dicotyledonous plants

EPPO recommends its members, particularly in relation to reports of field trials on plant protection products, to use the BBCH Scales for growth stages of crops and weeds. These have been published by Blackwell Wissenschaft, Berlin (DE) in 1997. No new edition has been published since, but an updated version the BBCH scales (edition 2001) is available from the BBA website. The BBCH scale is a system for a uniform numerical coding of phenologically similar growth stages of all mono- and dicotyledonous plant species. The BBCH scales can be downloaded as pdf files in German, English, French and Spanish, and cover the following plants:

Cereals, Rice, Maize
Oilseed rape, Faba bean, Sunflower
Beta beets
Potato
Fruits
Citrus, Olive, Coffee, Banana
Grapevine
Soybean, Cotton, Peanuts
Hop
Vegetable crops
Weeds

The use of this updated version is now recommended.

Source: **BBA website.**
http://www.bba.de/veroeff/bbch/bbch.htm

Additional key words: publications

EPPO *Reporting Service*

2004/057 New edition of EPPO Standards for the efficacy evaluation of plant protection products

Over the last 25 years EPPO has published more than 225 Standards for the efficacy evaluation of plant protection products. These Standards are addressed to all institutions, official registration authorities, private firms, public institutes under contract with private firms, involved in registration of plant protection products, and more particularly in efficacy evaluation trials. In 1997, the EPPO Standards for the efficacy evaluation of plant protection products were published in one complete set of four volumes. Annual updates have appeared since. As the number of new and revised Standards is now large, it was decided to republish them in 5 volumes:

Volume 1: Introduction, general standards, general index.
Volume 2: Fungicides, bactericides.
Volume 3: Insecticides, acaricides.
Volume 4: Herbicides, plant growth regulators.
Volume 5: Molluscicides, nematicides, rodenticides, side-effects on natural enemies.

The new edition of EPPO Standards for the efficacy evaluation of plant protection products can be ordered from the EPPO Secretariat, at a price of 360 EUR (complete set of 5 volumes). Orders should be addressed to the following address:

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Visit our Web site at www.eppo.org for more details

Source: EPPO Secretariat, 2004-03.

Additional key words: publications