

Larger fungi from Turkey, Iran and neighbouring countries

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Species of Agaricales, consisting of all the major families are reported from Turkey and Iran; a few records are from Afghanistan. Collections of *Conocybe pubescens* (Gill.) Kühn., *Nolanea sericea* (Mérat ex Fr.) P.D. Orton, *Panaeolus teutonicus* Bride & Métrod and *Podaxis pistillaris* (L. ex Pers.) Morse from Kuwait, and *Lentinus lepideus* (Fr. ex Fr.) Fr. from Pakistan are noted in passing. *Pleurotus eryngii* Fr. ex DC. was recorded in donkey food from Afghanistan. Eighty five agarics, four boletes (one not identified to species) and twelve Gasteromycetes are listed along with seven records from other families (Auriscalpiaceae 1, Bankeraceae 1, Cantharellaceae 2, Clavariaceae 1, Hydnaceae & Gomphaceae 3). Two Ascomycetes, *Morchella esculenta* Pers. ex St. Amans and *Hypoxylon sassafras* (Schw. ex Fr.) Curt. are recorded in an appendix. The most notable finds are *Amanita valens* Bull. ex Fr., *Collybia fuscopurpurea* (Pers. ex Fr.) Kumm. agg., *Conocybe coprophila* (Kühn.) Kühn., *Cortinarius olivaceo-fuscus* Kühn., *Inocybe gymnocarpa* Kühn., *Lactarius acris* (Bolt. ex Fr.) S.F. Gray, *L. ruginosus* Romagn., *Leccinum quercinum* (Pil.) Green & Watling, *Lentinellus tridentinus* (Sacc. & Syd.) Sing., *Lentinus degener* Kalchbr., *Lepiota cygnea* Lange, *L. jubilaei* Joss., *Micromphale brassiocolens* (Romagn.) P.D. Orton, *Psathyrella agaves* R.Mre., *Rhodocybe mundula* (Lasch) Sing., *R. truncata* (Schaeff. ex Fr.) Sing., *Rhodophyllus (Eccilia) lanicus* Romagn., *Russula adulterina* Fr. s. Melz. & Zvará, *R. maculata* Qué. and *R. subfoetens* Smith. Of particular note is the list of members of the Secotiaceae and Tulostomataceae which characterise arid areas; *Schizostoma* is apparently a new record from Iran. The list contains several other species evidently unrecorded for the countries documented, but caution must be exercised as our knowledge of the fungus floras of these regions is very poor. As much of the material lacked field data or was immature or both, some determinations are necessarily tentative. The fungal sociology of the areas however is indicated, as is the great potential of the mixed frondose/conifer woodland of Northern Turkey.

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The phanerogamic flora of Turkey, Iran and neighbouring countries commands a great deal of interest in many centres of botanical teaching in Europe, e.g. Edinburgh, Davis et al. However, the flora of the macrofungi has been poorly studied and a true picture of the distribution of many of our European fungi is very vague as to where the species reach their eastern limits. The present compilation therefore helps clarify some of these uncertainties. Unfortunately as much of the material lacked copious field data and some is immature several determinations are only tentative, but nevertheless we feel these give some indication of the constituent members of the flora. Although only comparatively small in number, the collections examined indicate the great mycological potential of the frondose/conifer woodland of northern Turkey. Parallels can

be drawn also with other areas in the near east and within the mediterranean basin, eg. in Israel (Binyamini 1976). The preliminary results recorded here, apparently indicate a close relationship between the area under study and European Basidiomycete flora, particularly Eastern and Southern constituents. The present compilation extends the information on the species from Northern Iran discussed in Watling and Sweeney (1974). Of particular note is the interesting assemblage of Gasteromycetales which characterise arid regions of the world and confirms the apparent similarity in fungal floras of these areas, from the Steppes of Central Europe and the Middle East to the deserts of Australia and Africa and the New World.

Material

The material was collected by Dr Ilkka Kukkonen, Pertti Uotila and Mauri Korhonen during the Finnish Botanical expedition to West-Central Asia in 1972 (for itinerary see Kukkonen and Uotila 1976). The total number of fungi collected was ca. 750, of which 76 % were macrofungi. Collections were chiefly made in Bavaria in Germany, Montenegro in Yugoslavia, NW Turkey, the Hyrcanian forest area of Northern Iran, the mountains north of Rawalpindi in Pakistan and in North West India (Himachal Pradesh).

The material is deposited in H, with sets of Turkish and Iranian fungi in E and K.

Apart from the groups dealt with here, notes on the Aphyllorphales have been published separately (Niemelä & Uotila 1977). We are grateful to Dr V. Demoulin, Liège, for confirmation of the identity of *Bovista polymorpha*, and to Dr A.J.S. Whalley,

Sunderland, for the identification of *Hypoxylon sassafras*.

The nomenclature of the Agaricales follows Singer (1975) with some minor alterations. The Gasteromycetales follow Dring (1974).

Main collecting areas

Collections were made from over twenty localities, of which the two most frequently mentioned are as follows:

Loc. 313. Turkey, Bolu, ca. 15 km W of Bolu by road E5, Koru Motel, alt. 860 m, mixed forest with *Fagus* and *Abies bornmuelleriana* on gentle, roughly N-facing slope, 30.VIII. 1972. — **Loc. 317.** Turkey, Istanbul, ca 25 km N of Istanbul, Belgrad forest, oak and beech wood on steep N-facing slope, alt. ca. 200 m, 3.IX. 1972.

The localities are numbered as in the complete list of collecting sites visited on the expedition (Kukkonen & Uotila 1976).

Agaricales

Agaricaceae

Agaricus cf. *bitorquis* (Quél.) Sacc.

(*A. rodmanii* Peck)

Iran: Mazandaran, Amol, close to the hotel N of the town, 50 m, 8. VIII. 1972 Uotila 19376.

A. bitorquis is a fairly widespread fungus in both northern and southern hemispheres, usually associated with areas disturbed or modified by man. The present collection differs from European, N American and Australian collections examined in size, but resembles collections from the last continent in the slightly yellowish flesh. Conspicuity of these yellowing forms with the normal has been confirmed by mating experiments (pers.comm. Carlene Raper).

A. semotus Fr.

Turkey: Istanbul, loc. 317, Korhonen 1157.

A fairly common *Agaricus* usually found under *Picea*, although occasionally in temperate countries under other exotic tree species. A rather variable fungus occurring in the literature under the names *Psalliota rubella* (Gill.) Rea and *P. amethystina* (Quél.) J. Lange depending on the development of the vinaceous colours. *Psalliota* is a synonym of *Agaricus*.

Recorded by Binyamini (1976) from Israel.

Amanitaceae

Amanita valens Bull. ex Fr.

Turkey: Samsun, loc. 302, ca. 30 km S of Samsun on the road to Ankara, low, young *Quercus* forest on a dry slope facing approx. W, 570 m, 26. VIII. 1972 Korhonen 1173.

A rather uncommon species, southern in its distribution in Europe. Characterised by the amyloid, ellipsoid basidiospores $11-13.5 \times 7-8.5(-9) \mu\text{m}$.

A. vaginata (Bull. ex Fr.) Vitt.

Turkey: Bolu, loc. 311, Akyarm, ca. 120 km NW of Ankara on the road to Istanbul, rocky *Pinus* forest on a gentle slope, 1560 m, 29. VIII. 1972 Uotila 19978; Bolu, loc. 313, at foot of *Populus tremula* in grassy place, Uotila 20093.

A complex group of varieties and forms accepted at specific level by some authorities. Impossible to be more exact without field data.

Bolbitiaceae

Agrocybe semiorbicularis (Bull. ex St.Amans) Fayod

Afghanistan: Baghlan, loc. 121, Khenjan, in flower bed of garden of Khenjan Hotel, 1080 m, 13.V. 1972 Uotila 16620. — Turkey: Ordu, loc. 300, shore of Milic river, near Black Sea coast, ca. 20 km W of Ünye, 10 m, 26.VIII. 1972 Korhonen 1171.

A widespread cosmopolitan agaric found in both hemispheres of the world, although probably

endemic only to the north; the August collection approaches *A. arenicola* (Berk.) Sing. but without field notes this cannot be confirmed.

***Conocybe coprophila* (Kühn.) Kühn.**

Turkey: Ankara, loc. 309, near Gargassemez village, ca. 80 km NW of Ankara on the road to Istanbul, dry grazed hillside, growing scrubby *Quercus*, 1120 m, 29.IX. 1972 Korhonen 1175.

Usually considered a boreal and alpine agaric, although found amongst collections of fungi from Texas, U.S.A. *Galera viscosa* Clements is probably a synonym.

***C. lactea* (J. Lange) Métrod**

Turkey: Ordu, loc. 300, in pastured meadow on shore of Miliç river, near Black Sea coast, ca. 20 km W of Ünye, ca. 10 m, 26.VIII. 1972 Korhonen 1172.

A typical collection of this taxon with large, thick-walled basidiospores falling into a wide range of size and shape; the overall pale colours of the dried basidiocarp are characteristic.

A mixed collection from Iran in rather bad state of preservation undoubtedly contained this species:

Iran: Khorasan, loc. 101, Tayyebat, in garden and yard of Hotel Inn, in centre of the village, 840 m, 4.V. 1972 Korhonen 1132.

This species is world-wide in distribution; recorded by Binyamini (1976) from Israel.

***C. magnicapitata* Orton**

Iran: Mazandaran, loc. 89, ca. 20 km E of Gorgan on the road to Mashhad, almost pure *Parrotia* forest, bare ground, 70 m, 29.IV. 1972 Uotila 16044.

Characterised by large-headed caulo- and cheilocystidia and medium sized, fairly thick-walled basidiospores, rarely exceeding 11 μm in length.

***C. aff. mesospora* Kühn. ex Singer**

Afghanistan: Samangan, loc. 129, Kotal-i-Mirza Atbili Pass on the road from Pule-Khumri to Samangan (Aybak), N facing slope, on silt, 1400 m, 14.V. 1972 Uotila 16706, 16707.

Two collections in the *Conocybe mesospora* complex although not conspecific. It is impossible to be more precise without field data. No needle-like crystals were formed in aqueous ammoniacal solutions, although lecythiform cheilo- and caulocystidia were located. Both collections had 4-spored basidia. Basidiospores were slightly different in each case (Uotila 16706) 7.75–9 \times 5–6 μm and (Uotila 16707) 8.25–10 \times 5.5–6 μm ; all spores were thick-walled, ellipsoid in face-view and slightly flattened in side-view.

***C. pubescens* (Gill.) Kühn.**

Kuwait: University Gardens, ground treated with organic fertilizer, V.1975 Moustafa 1.

Although mixed with *Panaeolus teutonicus* in sample 1 and rather badly preserved, the microscopic characters, particularly the large complex-walled basidiospores, are typical of this taxon.

Boletaceae

***Boletus queletii* Schulz.**

Turkey: Bolu, loc. 313, Korhonen 1205.

A species which is connected with the Fagaceae in Northern Europe but tends to be southern in several countries. Closely related to *B. erythropus* (Fries) Krombh. and *B. junquilleus* (Qué.) Boud. (see Watling 1970) but differs microscopically in the amyloid flesh.

***Leccinum aff. carpini* (Schulz.) Moser ex Reid**

Turkey: Bolu, loc. 313, Korhonen 1182.

This material represents one of the taxa in the *L. carpini* — *crocipodium* complex, ie. section *Luteoscabra*, which apparently is in need of careful collection and documentation in the Mediterranean basin. The habitat is rather different to that in which it is found in Northern Europe but it must be appreciated the group is there at its northern limit. The material has slightly different spore morphology to *L. carpini*. Binyamini (1973) alludes to the unsatisfactory naming of members of this group; he records *L. crocipodium* from Israel.

***L. aff. insigne* Smith, Thiers & Watling**

Turkey: Bolu, loc. 313, Korhonen 1198.

The swollen and tapered tip to the end-cells of the pileipellis relate this collection to the N American *L. insigne*. The habitats, however, are not parallel in the two areas.

***L. quercinum* Pil. ex Green & Watling**

Turkey: Bolu, loc. 313, Uotila 20066.

Rather typical specimen of this segregate of *L. aurantiacum* (Bull. ex Fr.) S.F. Gray which occurs with members of the Fagaceae. Differs from true *L. aurantiacum* in the overall colouration, and particularly the disposition of the pigment in the pileipellis.

***L. aff. subleucophaeum* Dick & Snell**

Turkey: Bolu, loc. 313, Korhonen 1219.

The main characteristics of this taxon are the wide basidiospores and the discolouration of the flesh. Without field data one cannot be more specific, as

even in North America a number of variants close to *L. subleucophaeum* are indicated by Smith and Thiers (1971).

Leccinum sp. sect. **Leccinum** (cf. 1198)

Turkey: Bolu, loc. 313, Korhonen 1220. Immature.

Coprinaceae

Coprinus niveus (Pers. ex Fr.) Fr.

Turkey: Ankara, loc. 309, near Gargassemez village, ca. 80 km NW of Ankara on the road to Istanbul, on dry, grazed hillside growing scrubby *Quercus*, 1120 m, 29.VIII. 1972 Korhonen 1177.

Probably growing on old dung or soil where dung had been; apparently a widespread and fairly common member of the genus, e.g. Binyamini (1976) records it from Israel.

Panaeolus cf. **olivaceus** Moeller

Afghanistan: Samangan (Aybak), loc. 130, Hotel Aybak, on gravelly-clayey wasteland, 950 m, 14.V. 1972 Korhonen 1137.

A little recorded taxon and therefore the variation within the species is not really known. Although recorded originally from the Faroes, it seems to be much more widely distributed.

P. aff. papilionaceus (Bull. ex Fr.) Quél.

(*P. papilionaceus* s. Moser)

Afghanistan: Samangan (Aybak), loc. 130, Hotel Aybak, on gravelly-clayey wasteland, 950 m, 14.V. 1972 Korhonen 1138.

Agrees with Moser's interpretation of this species; we know little about *Panaeolus* spp. from this part of the world; variation within this species might be expected, and therefore this collection could be placed herein.

P. teutonicus Bride & Métrod

Iran: Mazandaran, loc. 258, ca. 5 km N of Amol, small dammed lake (pH 7) by the road, on shore, on horse dung, 60 m, 8.VIII. 1972 Uotila 19296. — Kuwait: University Gardens, ground treated with organic fertilizer, V.1975 Moustafa 1.

Singer synonymises this with *P. solidipes* Peck, a North American species, and *P. phalaneorum* (Fr.) Quél. s. Ricken and Kühner & Romagnesi; he uses the name *Anellaria sepulchralis* (Berk.) Singer. Recorded previously from Iran by Watling and Sweeney (1974). A mixed collection (sample 1) received from Kuwait contained what can only be considered this species. Slight traces of veil could be seen on the stipe but in all other ways it was typical.

Psathyrella candolleana (Fr.) Maire agg.

Afghanistan: Samangan, loc. 129, Kotali-i-Mirza Atbili Pass on the road from Pule-Khumri to Samangan (Aybak), S facing slope, in sand, 1400 m, 14.V. 1972 Korhonen 1136. — Turkey: Izmit, loc. 316, Sapanca Gölü Lake, 3 km W of Saracoglu Motel, gravelly roadside, 40 m, 1.IX. 1972 Korhonen 1152.

The last collection is very close to *P. candolleana* but differs in the presence of utriform pleurocystidia.

One other collection has been referred to *P. candolleana* with varying degree of confidence.

Turkey: Istanbul, loc. 317, shore of pond, Uotila 20193.

P. candolleana is a complex of morphologically similar taxa; in the broad sense it is a widespread and common fungus recognised by the fairly small spores (8–10 µm long), lack of distinctive pleurocystidia and velar remnants on the pileus. It occurs in Europe in at least four quite separate mating groups (M. Jurand pers. comm.) and it remains to be seen whether they are correlatable with the small morphological difference which can be demonstrated between collections. Binyamini (1974) records this species for Israel.

P. melanthina (Fr.) Kühn. & Romagn. agg.

Turkey: Istanbul, loc. 317, Korhonen 1155.

Recalling *P. candolleana*, but spores slightly larger and paler in colour under the microscope. It agrees in all microscopic characters with *P. agaves* R. Maire.

P. prona (Fr.) Gillet

(*P. prona* var. *utriformis* Kits van Waveren)

Turkey: Bolu, loc. 313, Uotila 20074.

The lack of vinaceous colours in the dried specimens, the non-coprophilous habitat preference and large spores are characteristic of this species. The utriform pleurocystidia separate this variety which van Waveren (1972) considers the same as *P. vino-sofulva* P.D. Orton.

P. spadiceogrisea (Fr.) Maire agg.

(*P. cortinarioides* P.D. Orton)

Turkey: Istanbul, loc. 317, Korhonen 1162.

Undoubtedly a complex of closely related taxa; difficulties in culturing at the moment would indicate that at present it will not be possible to separate the constituent entities. The pleurocystidia and basidiospores are characteristic for the species as it is normally defined; as indicated this collection may be *P. cortinarioides* P.D. Orton but without field data this is impossible to confirm.

Binyamini (1974) records a collection under this name from Israel.

Cortinariaceae**Cortinarius cotoneus** Fr.

Turkey: Bolu, loc. 313, Korhonen 1208.

A member of subgenus *Cortinarius* characterised by the olivaceous colours, tomentose scaly pileus and subglobose basidiospores. A fairly widespread fungus in deciduous woods, especially under *Fagus* and *Quercus*.

C. ? malachoides P.D. Orton

Turkey: Bolu, loc. 313, Uotila 20076. Taste mild, context blue.

This is *C. malachus* Fr. s. Ricken and Lange: it was given a new name by Orton (1960) based on British material and placed in subgenus *Sericeocybe*. A definite determination cannot be made because of the immature nature of the collection, although the large basidiospores present, would tend to support the suggestion. Usually found under conifers.

C. olivaceo-fuscus Kühn.

Turkey: Bolu, loc. 313, Uotila 20088.

A species in the *Cortinarius* (*Dermocybe*) *cinnamomeus* complex growing under *Fagus*. This species lacks the golden tawny colours and robust nature of *C. malicorius* Fr. Orange amorphous material was found in the hymenophoral trama.

Crepidotus mollis (Schaeff. ex Fr.) Kumm.

Turkey: Bolu, loc. 313, Korhonen 1186.

A common and widespread fungus growing on bark of deciduous trees; more rarely on coniferous wood. The present material agrees with the type variety.

Galerina unicolor (Vahl ex Sommerf.) Sing.

Turkey: Trabzon, loc. 293, ca. 2 km S of Hamsiköy, ca. 60 km SW of Trabzon on the road to Gümüşhane, *Picea* forest on a steep N facing slope, 2330 m, 23.VIII. 1972 Korhonen 1148a.

Recorded by Watling and Sweeney from Iran (1974); the comments made therein are applicable to this collection. The present collections agree with the concept of Bas (1960) for *G. marginata* (Batsch. ex Secr.) Kühner.

Inocybe fastigiata (Schaeff. ex Fr.) Quéf.

Turkey: Bolu, loc. 313, Korhonen 1202.

Probably referable to this taxon, although immature. A widespread and common member of *Inocybe* subgenus *Inocybe*; recorded from Israel by Binyamini (1974).

I. gymnocarpa Kühn.

Turkey: Bolu, loc. 313, Korhonen 1193.

Apparently this species is common under conifers in the mountains (Kühner & Romagnesi 1953). Characterised in the subgenus *Inocybe* by the relatively large spores and distinct cortinoid remains on the pileus, which give the basidiocarps a fibrillose character, particularly towards the pileus-margin. The gills are dark olivaceous brown, resembling *Psilocybe* spp. but with bands of cystidia forming a white margin. Facial cystidia numerous and with characteristic yellowish inclusions.

I. xanthomelas Boursier & Kühn.

Turkey: Bolu, loc. 313, Korhonen 1202.

The present material agrees with the original description (Kühner 1933). It can be recognised in both fresh and dried material, by the yellow colouration. A member of subgenus *Clypeus*.

Entolomataceae (Rhodophyllaceae)**Rhodophyllus (Eccilia) lancinus** Romagn.

Turkey: Istanbul, loc. 317, Korhonen 1158, and Uotila 20192.

This is a member of the *Ecclia undata* group which has been confused both nomenclatorially and taxonomically. Orton (1960) introduced the name *E. sericeonitida* for this fungus because *Agaricus* (*Clitopilus*) *undatus* Fr. is pre-dated by *A. undatus* B. & Br.; the latter is a species of *Collybia*. Dennis, Orton & Hora (1960) cite Lange (1930) Plate 79A (*undatus*) as representing their concept, although this same plate had been quoted (erroneously as 97A) for *Rhodophyllus undatus* var. *viarum* (Fr.) Romagn. Romagnesi in the same publication described *R. lancinus* with a narrow pubescent-pruinose stipe, slightly shorter basidiospores and presence of guttulate cells in the hymenium; apparently this is Lange's *E. undatus* var. *pusillus*.

Probably formerly confused with *E. sericeonitida* and therefore the true distribution is not known.

R. (Entoloma) sericeus (Bull. ex Mérat) Quéf.

Kuwait: University Gardens, on lawns treated with fertilizer, V.1975 Moustafa 2.

A common and widespread grassland agaric, particularly common in Europe on lawns and in grassy places near human habitation. Possibly introduced into the Persian Gulf region. Orton (1960) placed this species in *Nolanea*.

Hygrophoraceae**Hygrophorus chrysodon** (Batsch ex Fr.) Fr.

Turkey: Bolu, loc. 313, Uotila 20080.

Widely reported from oak and beech woodland; characterised by the yellowish colour and yellow dots at stipe-apex and on pileus margin.

Hygrocybe conica (Scop. ex Fr.) Kumm.

Turkey: Bolu, loc. 313, Uotila 20087.

Probably referable to this species although immature. *H. conica* is widely distributed in both grassland and woodland communities in Europe.

Flammulaster aff. **ferruginea** (Maire apud Kühn.) Watling

Iran: Mazandaran, loc. 89, ca. 20 km E of Gorgan on the road to Mashad, almost pure *Parrotia* forest, bare ground, 70 m, 29.IV.1972 Uotila 16043.

Placed by Singer (1972) in *Phaeomarasmium* which the senior author considers a genus containing several elements. *Flammulaster ferruginea* is related to the genus *Tubaria*. Orton places this same taxon in *Flocculina*; although undoubtedly a good genus the name is preoccupied, hence the use of Earle's genus *Flammulaster*. *F. ferruginea* is not uncommon on soil or in moss in open woodland and is figured in Lange (1930) under the name *Naucoria siparia* (Fr.) Gillet. Fries' fungus however grows on woody and plant debris, and the basidiospores are much larger.

Tubaria cf. **trigonophylla** (Lasch) Fayod

Turkey: Bolu, loc. 313, Uotila 20073.

The relatively small ellipsoid basidiospores and subcylindric cheilocystidia with a small head, are characteristic. Rarely recorded and therefore its true distribution is not known. Unfortunately the material is mostly immature.

Lepiotaceae

Lepiota cf. **badhamii** (Berk.Br.) Quéf.

Turkey: Istanbul, loc. 317, Korhonen 1163.

Unfortunately the specimen is incomplete. This is very similar to *L. meleagroides* Huijsman which was placed in *Leucocoprinus* by Moser (1967). This is not *Leucoagaricus badhamii* s. Singer, or *Leucocoprinus badhamii* s. Moser which both refer to *Lepiota bresadolae* Schulzer.

L. cygnea Lange

Turkey: Istanbul, loc. 317, Korhonen 1164.

A rather infrequently collected agaric with many similarities to *L. parvannulata* (Lasch.) Gillet but differs from this species in basidiospore shape and presence of lageniform to \pm fusiform cheilocystidia. The present collection has marginally smaller spores to those of western European collections.

L. holosericea (Fr.) Gill.

Turkey: Istanbul, loc. 317, Korhonen 1160; on road embankment, 170 m, Uotila 20224.

The epithet *holosericea* has been used following Moser (1967); although normally synonymised under *Leucoagaricus naucinus* (Fr.) Sing., *L. naucinus* covers a complex of closely related taxa. Orton (1960) uses the name *Lepiota leucothites* (Vitt.) P.D. Orton for the same fungus. A widespread agaric apparently preferring warmer temperate climates.

L. jubilaei Joss.

Turkey: Istanbul, loc. 317, Korhonen 1163.

Only recently described from Rhône, France (Josserand 1974). Closely related to *L. badhamii* (see above) and *L. rufovelutina* Vel. if in the original sense the latter is any different to *L. badhamii*.

L. cf. littoralis Menier

Turkey: Istanbul, loc. 317, Korhonen 1154.

This collection is very close to *L. littoralis*, in its cheilocystidia being ventricose to fusiform and covered with crystalloid material, which is an unusual feature; the basidiospore are marginally smaller. The habitat is, however, quite different to that described by Bon & Boiffard (1972) for this fungus which they placed in *Leucoagaricus*.

L. rhodorhiza Romag. & Locq. ex P.D. Orton

Turkey: Istanbul, loc. 317, Korhonen 1163.

This is *L. setulosa* Lange s. Kühn., and *L. setulosa* var. *rhodorhiza* Romag. & Locq. It differs from *L. setulosa* in the larger basidiospores and development of reddish brown fibrils at the base of the stipe. Although validated by Orton, based on British material, this agaric is probably more frequent in continental Europe.

Marcoplepiota procera (Scop. ex Fr.) S.F. Gray

Turkey: Bolu, loc. 311, Akyarm, ca. 120 km NW of Ankara on the road to Istanbul, rocky pine forest on a gentle slope, 1560 m, 29.VIII. 1972 Uotila 20028.

A very distinct large parasol mushroom with large basidiospores equipped with an enormous distinct germ pore. Widely distributed in both woodland copses and gardens.

Pleurotaceae

Lentinus degener Kalchbr.

Turkey: Bolu, loc. 313, on trunk of dead *Populus tremula*, Uotila 20067.

A not uncommon fungus on *Populus* characterised by cylindric cystidioid elements ending in capitate or clavate apices. Probably continental in distribution.

L. leptideus (Fr. ex Fr.) Fr.

Pakistan: Hazara, Murree Hills, Khaira Gali, ca. 2000 m, 9.VII. 1972 Kukkonen 9334.

Basidiospores in this collection are at the low end of the range accepted for European material, otherwise the material is typical. A widespread fungus on coniferous wood; the substrate is unfortunately not recorded.

L. tigrinus (Bull. ex Fr.) Fr.

Iran: Mazandaran, loc. 261, ca. 20 km E of Chalus, *Alnus* forest by a small slow river with shoreline covered by *Sparganium erectum*, *Iris* and *Typha*, decaying wooden pales of old bridge, 10 cm above water level, —25 m, 9.VIII. 1972 Uotila 19336.

Basidiospores in this collection are at the low end of the range accepted for European material; otherwise the material is typical. A widespread fungus growing on stumps of broadleaved trees, especially of *Salix* and *Populus*.

Pleurotus dryinus (Pers. ex Fr.) Kumm.

Afghanistan: Baghlan, loc. 121, Khenjan, garden of Khenjan Hotel, in flower bed on bare ground by rotten wood, 1080 m, 13.V. 1972 Uotila 16622.

Characterised by the membranous-tomentose veil left at the pileus-margin, structure which might be also slightly evident on the stipe. Very similar to *Lentinus* spp. but possessing slightly differentiated sterile cells on gill-margin. *P. corticatus* Fr. is a synonym. A widespread fungus on several broadleaved tree species; the present material is sunbleached.

P. eryngii Fr. ex DC.

Afghanistan: Kabul, (Originally on ground in mountains above Kabul. Sold in the city from donkey bag. Name 'Samorok'.) above 2000 m, 10.V. 1972 Uotila 21114.

Probably originally attached to umbelliferous stems; very variable in morphology. Widely used as food in the Middle East and Pakistan: this present collection was compared with material sent to M. Furrer from Pakistan (VII.1971: Wat. 9307) and determined by R. Singer.

Russulaceae**Lactarius acris** (Bolt. ex Fr.) S.F.Gray

Turkey: Bolu, loc. 313, Uotila 20094.

A rather infrequent member of the *Fuliginosus* characterised by the globose to subglobose alveolately reticulate ornamented basidiospores (7.8.—8.9 × 7.8—7.9 μm).

L. blennius (Fr. ex Fr.) Fr.

Turkey: Bolu, loc. 313, Uotila 20077, and Korhonen 1207.

A common and widespread European milk-cap growing with *Fagus*.

L. cf. bresadolianus Sing.

Turkey: Bolu, loc. 313, Korhonen 1199.

Although this milk-cap is reported as common in the mountains of Europe, the name has been in some dispute. It is the interpretation of *L. zonarius* Bull. ex Fr. adopted by Konrad & Maublanc (1924—35) which was given the new name of *L. zonarioides* by Kühner & Romagnesi (1953); the correct name is that given above. The basidiospores are more subglobose than for *L. zonarius*, although in the present collection the spores are at the small end of the range.

L. hepaticus Plowr. apud Boud.

Turkey: Istanbul, loc. 317, Korhonen 1161.

Without field notes difficult to be more precise. The epithet here is adopted as in Kühner & Romagnesi (1953). The spores agree more with *L. hepaticus* than *L. decipiens* being reticulate with verrucosities. *L. decipiens* Quél. with which it agrees perhaps more in habitat preferences has finely interrupted reticulate spores.

L. pallidus (Pers. ex Fr.) Fr.

Turkey: Bolu, loc. 313, Korhonen 1187.

A common, widespread European fungus.

L. ruginosus Romagn.

Turkey: Bolu, loc. 313, Korhonen 1207.

Very close to *L. pterosporus* Romagn. possibly only differing by the ornamentation of the basidiospores being less winged. See Romagnesi (BSMF 80; Atlas 145) in Bon (1964).

L. scrobiculatus (Scop. ex Fr.) Fr.

Turkey: Bolu, loc. 313, Uotila 20070 and 20072.

A common and widespread fungus of European mountains growing in coniferous woodland.

L. subdulcis (Pers. ex Fr.) S.F.Gray

Turkey: Bolu, loc. 313, Korhonen 1204.

A widespread member of the *Umbonati* usually in deciduous woodland, although sometimes recorded in Britain from the edges of conifer plantations; probably associated there with deciduous elements.

L. vellereus Fr. var. **velutinus** Bertill.

Turkey: Bolu, loc. 313, Korhonen 1211.

A taxon which really should have specific status differing in velvety margin to pileus and smaller

basidiospores, with ornamentation more parallel to that of *L. piperatus* Scop. ex Fr. than that of *L. vellereus*; the taste is said to be mild. A fairly common variant.

L. volemus (Fr.) Fr.

Turkey: Bolu, loc. 313, Uotila 20071.

A very characteristic fungus with subglobose to globose coarsely netted basidiospores and rather unique thick-walled cystidia. Common and widespread.

Russula acrifolia Romagn.

Turkey: Bolu, loc. 313, Akyarm, ca. 120 km NW of Ankara on the road to Istanbul, rocky *Pinus* forest on a gentle slope. 1560 m, 29.VIII. 1972 Korhonen 1179.

Formerly confused with *R. densifolia* Secr., from which it has only recently been separated by Romagnesi (1967). The main field difference is the acrid flesh. Microscopically the basidiospores are more distinctly ornamented with the warts connected to form a clearer network. Because of confusion the distribution is not known.

R. adulterina Fr. s. Melzer & Zvardá

Turkey: Bolu, loc. 313, Korhonen 1188.

Adopted in the sense of Romagnesi (1967) who indicates that this species is typical of the *Picea* and *Abies* forests on calcareous soil in the mountains. Recorded from Czechoslovakia. Characterised by huge spores with prominent isolated aculeate warts.

R. delica Fr. var. *trachyspora* Romagn.

Turkey: Bolu, loc. 311, Akyarm, ca. 120 km NW of Ankara on road to Istanbul, rocky *Pinus* forest on a gentle slope, 1560 m, 29.VIII. 1972 Korhonen 1178.

R. delica is a widespread and common fungus usually growing in deciduous woods, although often with conifers in mountain regions. Var. *trachyspora* differs in the larger basidiospores and more prominent warts which although with poorly developed interconnections are more evident than those in var. *delica*.

R. fellea (Fr.) Fr.

Turkey: Bolu, loc. 313, Korhonen 1195.

A common, cosmopolitan species with *Fagus*. Widespread in Europe; recorded by Binyamini (1976) for Israel.

R. luteotacta Rea

Turkey: Bolu, loc. 313, margin of path, Uotila 20062, and Korhonen 1183.

A widespread agaric but of sporadic occurrence in any one locality. Recalling *R. mairei* Sing. but for the yellow spotting; microscopically the basidiospores are ornamented with hemispherical to shortly conic, mostly isolated warts, but with a few joined into twos or threes.

R. maculata QuéL.

Turkey: Bolu, loc. 313, Uotila 20063.

The large subglobose to obovate basidiospores are characteristically ornamented with hemispherical warts and few to many connections forming an indistinct network. Not a very commonly encountered agaric and probably associated in Turkey with the *Fagus* more than the *Abies*.

R. mairei Sing.

Turkey: Istanbul, loc. 317, Uotila 20205.

A common widespread European fungus, totally confined to areas of *Fagus*.

R. aff. nitida (Pers. ex Fr.) Fr.

Turkey: Bolu, loc. 313, Korhonen 1209.

A highly misinterpreted agaric of the *Paludosinae*. The interpretation now accepted is that of Schaeffer (1952) and Kühner & Romagnesi (1953); it has been badly confused in Britain. Usually found under birch, only sometimes under conifers. The Turkish collection differs slightly in both microscopic characters and habitat preferences; these may be minimal however.

R. puellaris Fr.

Turkey: Istanbul, loc. 317, Korhonen 1169.

Although well known, some confusion has been experienced in the British Isles in respect to spore-mass colour of this species. The interpretation here adopted is that of Romagnesi (1967), ie. cream spore-deposit. A fairly common fungus in both deciduous and coniferous woods throughout Europe.

R. subfoetens Smith

Turkey: Bolu, loc. 313, Korhonen 1213.

Intermediates exist between this and *R. foetens* (Pers. ex Fr.) Fr. and therefore perhaps not worthy of specific rank. Differs from the latter in lower warts in the basidiospore ornamentation and flesh yellowing with aqueous solutions of potassium hydroxide.

R. ? zonatula Ebbesen & J. Schaeff.

Turkey: Bolu, loc. 313, Korhonen 1197.

A rather rare agaric usually associated with *Fagus*, and with which the writers are unfamiliar. The globose basidiospores with small to medium high isolated warts are quite characteristic.

R. xerampelina (Schaeff. ex Secr.) Fr.

Turkey: Bolu, loc. 311, Akyarm, ca. 120 km NW of Ankara on the road to Istanbul, rocky *Pinus* forest on a gentle slope, 1560 m, 29.VIII. 1972 Uotila 19997.

In basidiospore details this agrees with *R. cicatricata* Romagn. ad. inter. (1967) with medium sized warts lacking interconnecting veins or reticulations. *R. xerampelina* is a widespread, common and very variable fungus in Europe, undoubtedly composed of several closely related taxa the limits of which cannot at the moment be clearly defined.

Tricholomataceae

Armillaria mellea Vahl ex Fr. agg.

Turkey: Bolu, loc. 313, Korhonen 1190.

This is not referable to *A. mellea* (Vahl ex Fr.) Kumm. s. stricto because it not only lacks the yellow veil remnants but differs in more elongate basidiospores and papillate cheilocystidia. *A. mellea* has for too long now been an epithet referable to a whole range of taxa.

Clitocybe gibba (Pers. ex Fr.) Kumm.

Turkey: Bolu, loc. 313, Korhonen 1184.

Probably better known under the name *C. infundibuliformis* (Schaeff. ex Fr.) Quéf. A widespread and fairly variable agaric with several minor colour forms. It may be found as much in grassland as in woodlands.

A second collection also from Turkey is not in complete agreement but with lack of field data to the contrary it must be regarded as close:

Turkey: Istanbul, loc. 317, Korhonen 1156.

Collybia fusco-purpurea (Pers. ex Fr.) Kumm. agg.

Turkey: Bolu, loc. 313, Uotila 20078 and 20065.

An uncommon to rare fungus characteristic of deciduous woods. Dennis, Orton & Hora (1960) take Lange's plates 46E' & E as referring to different agarics. The Turkish material agrees with plate 46E which should probably be more correctly called *C. obscura* Favre.

C. peronata (Bolt. ex Fr.) Kumm.

Turkey: Istanbul, loc. 317, Korhonen 1167.

A very common, widespread fungus typical of

broad-leaved woodland. Probably better known under the name *Marasmius peronatus* (Bolt. ex Fr.) Fr.

Marasmius calopus (Pers. ex Fr.) Fr.

Turkey: Istanbul, loc. 317, Korhonen 1159.

Probably not an uncommon fungus in Turkey in frondose woodland on twiggy debris, petioles of leaves and the tougher parts of grasses and sedges. Widespread in Europe but recorded under the name *M. candidus* Bolt. s. Lange and *M. languidus* Fr. s. Quéf.

M. rotula (Scop. ex Fr.) Fr.

Turkey: Bolu, loc. 313, Uotila 20064; Istanbul, loc. 317, close to pond shore, Uotila 20195.

A very common widespread fungus in the northern hemisphere growing on twigs and small branches of broad-leaved trees; recorded from both Europe and N America. It is very consistent in its characteristics and has been previously recorded from Iran (Watling & Sweeney 1974).

M. splachnoides (Fr.) Fr.

Turkey: Istanbul, loc. 317, close to a spring, Uotila 20211.

This collection is very close to *M. androsaceus* (L. ex Fr.) Fr., although the habitat preference would suggest *M. splachnoides*. In western Europe this species is far less common than the widespread *M. androsaceus*, with which it has been undoubtedly confused.

Micromphale brassicolens (Romagn.) P.D.Orton

Turkey: Istanbul, loc. 317, Uotila 20215.

Unrecorded from Turkey although probably confused in many parts of Europe with *Micromphale foetidum* (Sow. ex Fr.) Sing. from which it differs in the smaller basidiospores. It grows in small tufts on leaves of *Fagus*.

Mycena alcalina (Fr. ex Fr.) Kumm.

Turkey: Bolu, loc. 313, Korhonen 1191.

Characterised by ellipsoid to broadly ellipsoid basidiospores and lageniform cheilocystidia with abruptly narrowed apex. Apparently a widespread agaric on woody debris of conifers.

M. fibula (Bull. ex Fr.) Kumm.

Turkey: Istanbul, loc. 317, Uotila 20199.

A common, widespread and cosmopolitan species. Placed by Singer (1975) in the genus *Gerronema*.

M. integrella (Pers. ex Fr.) S.F.Gray

Turkey: Istanbul, loc. 317, margin of spring, Uotila 20209.

Basidiospores characteristically fusoid-amygdali-form. Rather poor material growing on woodland debris. This fungus has been placed in the genus *Delicatula*.

M. sanguinolenta (Alb. & Schw. ex Fr.) Kumm.

Turkey: Istanbul, loc. 317, Uotila 20200 and 20212.

A widespread agaric growing on all kinds of leafy and twiggy debris in both conifers and deciduous woodlands throughout Europe.

M. stylobates (Pers. ex Fr.) Kumm.

Turkey: Istanbul, loc. 317, Uotila 20214.

The commonest *Mycena* in the *Basipedes* growing on grass stems, leaves of frondose trees, petioles and sometimes small twigs, but never branches. Characterised by the ellipsoid-cylindric basidiospores, filiform cystidia and basal disc. Widespread.

Omphalina velutina (Quél.) Quél.

Turkey: Trabzon, loc. 293, ca. 2 km S of Hamsiköy, ca. 60 km SW of Trabzon on the road to Gümüşhane, *Picea* forest on a steep N facing slope, 2330 m, 23.VIII. 1972 Korhonen 1148a.

One of the common dull grey *Omphalina* spp. found in Europe, probably better known under the name *O. grisella* Weinm.

Oudemansiella radicata (Relhan ex Fr.) Sing.

Turkey: Bolu, loc. 313, Korhonen 1200, and Uotila 20068.

A common and widespread species growing in Europe under *Fagus* the roots to which it is usually attached by a long pseudorhiza. Although variants have been described this material agrees with the type variety. Found in all major areas of the world.

Panellus stipticus (Bull. ex Fr.) Karst.

Turkey: Bolu, loc. 313, Korhonen 1196; Samsun, loc. 302, ca. 30 km S of Samsun on the road to Ankara, low young *Quercus* forest on a dry slope facing approx. W, stump of *Ostrya*, 570 m, 26.VIII. 1972 Uotila 19887; Bolu, loc. 60, Boludagi Pass on the road E5 to Ankara, ca. 20 km E of Düzce, *Rhododendron-Fagus* forest on N facing, fairly steep slope, on the basal parts of the trunks of *Carpinus orientalis* (Uotila 15534), 650 m, 12.IV. 1972 Uotila 15538; Istanbul, loc. 317, decaying branch of deciduous tree close to pond shore, Uotila 20190.

A very common agaric growing on deciduous wood from early spring until late autumn, usually in tightly packed imbricate clusters. Widespread in Europe and N America, but never recorded so extensively before from Turkey.

Rhodocybe mundula (Lasch) Sing.

Turkey: Istanbul, loc. 317, Uotila 20198 and 20206.

A much overlooked fungus because of the dull colouration and habitat preferences. The flesh becomes slightly grey or blackish. Although not common in the British Isles it becomes more frequent and common in Continental Europe. This and the next species have been placed in the Rhodophyllaceae but at the moment we prefer to include them in the Tricholomataceae. This particular species has been placed in no less than five genera other than the genus of its present deposition.

R. truncata (Schaeff. ex Fr.) Sing.

Turkey: Istanbul, loc. 317, Korhonen 1166.

A rather rare fungus whose distribution has not extensively been studied. Obviously a very variable species in which both Kühner & Romagnesi (1953) and Maire (1924) have described several variations. Without field data it is impossible to refer this collection to any one of these.

Strobilurus stephanocystis (Hora) Sing.

Turkey: Ankara, loc. 62, at border of Bolu and Ankara, ca. 115 km NW of Ankara on the road to E5, meadow at a rivulet in *Pinus* forest, 1390 m, 12.IV. 1972 Uotila 15583.

Probably endemic to the *Pinus* forests of the boreal region. Although not attached to a cone, there is little doubt that this collection had sprung from one. Dennis, Orton and Hora (1960) placed this species in *Pseudohiatula*. The whole *Marasmius esculentus/conigenus* complex in which this species was formerly placed has been badly confused both nomenclatorially and taxonomically. The present collection has pronounced capitate to subcapitate cystidia with external granulations.

Tricholoma macrocephalum Schulz.

Iran: Khorasan, loc. 246, Mohammed Reza Shah Wild Life Park, Tangehgol, brooklet ravine just N of the office building in the park, luxuriant mixed deciduous forest, 650, 3.VIII. 1972 Korhonen 1124a.

The fungus is referred with hesitation, to this name. The basidiospores are amyloid and in all respects it agrees with the concept of Kühner & Romagnesi (1953). A rare fungus described from Hungary; as it has been most frequently recorded from Eastern Europe it might be expected to occur in Turkey. Alessio (1976) has recently described this species under the name *Leucopaxillus macrocephalus* (Schulz.) Bohus. Our material differs slightly in basidiospore size but the cheilocystidia although numerous are typical, ie. poorly differentiated. The fungus in Italy has been found in rich deciduous woodland.

Aphylophorales

For families not dealt with here see Niemelä & Uotila (1977), ie. Fistulinaceae, Ganodermataceae, Hymenochaetaceae, Polyporaceae, Schizophyllaceae and Stereaceae.

Auriscalpiaceae (Lentinellaceae)

Lentinellus tridentinus (Sacc. & Syd.) Sing.

Turkey: Istanbul, loc. 317, Uotila 20226.

A rather rare, although rather characteristic fungus. In Britain it has been found on various herbaceous substrates; in the Alps Kühner & Romagnesi (1953) describe it from *Sorbus*. It is rather easily overlooked and because of this its true distribution is not fully appreciated.

Bankeraceae

Phellodon niger (Fr. ex Fr.) Karst.

Turkey: Bolu, loc. 313, Uotila 20085.

The stipe of this fungus is characteristically thickened with a felty layer, and the flesh is black. The globose, echinulate basidiospores vary very little in dimensions (3.5–4.5 μm). Maas Geesteranus (1975) records this species from frondose woodland (*Quercus* and *Fagus*) and from *Picea* woods but rarely from under *Pinus*.

Cantharellaceae

Cantharellus cibarius Fr.

Turkey: Bolu, loc. 313, Uotila 20082; Istanbul, loc. 317, Uotila 20197.

Typical material of this apparently world wide species. Corner (1966) has not seen *C. cibarius* in the tropics, although Heinemann (1958) reports it as common in the Congo. It grows in both coniferous and frondose wood in Europe, N America and Asia; also recorded from the rain forest areas of Queensland (Watling, unpubl. data).

Craterellus cornucopioides (L. ex Fr.) Pers.

Turkey: Bolu, loc. 313. Kukkonen 4934.

Typical material of this apparently widespread north temperate species, which is particularly characteristic of *Fagus* woodland. According to Corner (1966) this species is found in the tropics where several varieties are known.

Clavariaceae

Clavariadelphus cf. **pistillaris** (Fr.) Donk

Turkey: Bolu, loc. 313, Uotila 20079.

Without spore-print colour it is impossible to give a definite identification, although all other characters agree with this taxon. It is found in Europe, under scattered *Fagus* often on base rich soils and is often locally common.

Gomphaceae

Ramaria aurea (Fr.) Quéf.

Turkey: Bolu, loc. 313, Korhonen 1206.

A richly coloured coral-fungus found on the ground in both frondose and coniferous woods in Europe, North America and Asia Minor. Differs from the similarly coloured *R. flava* (Fr.) Quéf. in the less distinctly ornamented basidiospores.

R. formosa (Fr.) Quéf.

Turkey: Bolu, loc. 313, Uotila 20086.

A fairly widespread species of temperate Europe, N America and Asia. It grows on humus in frondose woodland.

R. mairei Donk

Turkey: Istanbul, loc. 317, Uotila 20201; Uotila 20207.

Immature collections but in colour of basidiocarps and in microscopic characters consistent with *R. mairei*. This is *Clavaria pallida* Bresadola (1906); it is characterised by very pale flesh-coloured branches tipped here and there with a vinaceous hue.

Hydnaceae

Hydnum repandum L. ex Fr.

Turkey: Bolu, loc. 313, Korhonen 1210.

Typical material of this common and well-known fungus. Some authors prefer to place this fungus and the following in the genus *Dentinum* S.F. Gray.

H. rufescens Fr.

Turkey: Istanbul, loc. 317, Korhonen 1165.

Differs from *H. repandum* in the smaller more slender and more deeper coloured basidiocarps with the spines somewhat more decurrent.

Gasteromycetales

Lycoperdaceae

Bovista polymorpha (v.H.) Kreisel

Turkey: Bolu, loc. 313, Korhonen 1201.

Probably better known in western Europe under the name *Lycoperdon ericetorum* Pers. In the recent circumscription of the genus *Bovista* by Kreisel (1967) the Bolu collection fits neatly into this taxon. Apparently distributed throughout the Mediterranean basin northwards to the British Isles and Scandinavia and eastwards into Asia Minor.

B. plumbea Pers. ex Pers.

Turkey: Ankara, loc. 309, near Gargassemez village, ca. 80 km NW of Ankara on the road to Istanbul, dry grazed hillside growing scrubby *Quercus*, 1120 m, 29.VIII. 1972 Korhonen 1176.

A widespread puff-ball of the northern hemisphere previously recorded from Turkey by Höhnelt (1905) and Pilát (1937). Eckblad (1970) summarises the distribution which extends the borders of the map in Kreisel (1967); recorded recently from Iran (Eckblad 1976). The collection approaches the fungus *B. pila*, a North American puff-ball, in virtue of its basidiospore morphology, shorter pedicel and rounder spore-head but the material is immature.

Calvatia cyathiformis (Bosc) Morg.

Afghanistan: Baghlan, loc. 229, Salang Pass, just N of Salang Tunnel, steep slope, E facing moist meadows at snow lay areas, 3100 m, 23.VI. 1972 Kukkonen 7460.

Previously reported from Afghanistan by Lange (1953). It seems to be fairly common in mountainous areas of the Near and Middle East. Recorded recently by Eckblad (1970) from Iran.

Lycoperdon molle var. *atropurpureum* (Vitt.) Smarda

Turkey: Istanbul, loc. 317, Korhonen 1168a.

Occurring throughout Europe in woodlands preferring base rich soils; also recorded from America and Africa. Differs from the type variety in larger basidiospores, brown exoperidial spines and chestnut-coloured gleba; the latter is much more widely distributed in Europe.

L. perlatum Pers. ex Pers.

Turkey: Bolu, loc. 313, Uotila 20089.

A very common and widespread puff-ball in temperature deciduous and coniferous woodlands.

Lycoperdon? umbrinum Pers.

Turkey: Giresun, 4 km E of Tirebolu, sandy embankment of the river Harsit, 5 m, 25.VIII. 1972 Uotila 19807.

Usually found in southern woodland areas; widely distributed in more southern provinces of Europe and would be expected to occur in Turkey. The present material probably occurred in a copse but with the habitat difference indicated we prefer to be rather cautious. Ahmad (1942) records from a similar site in the NW Himalayas a puff-ball under this name but his reference to *L. atropurpureum* Vitt. (see above) would suggest he was referring to *L. molle*. Considerable nomenclatorial confusion has blurred our knowledge of distributions on these two species. Pilát (1937) records it from Asia Minor (on soil in mountains, Ilgaz-Dagh).

Vascellum pratense (Pers.) Kreisel

Turkey: Istanbul, loc. 317, Korhonen 1168.

Typical material of this common, widespread puff-ball of both grassland and woodland areas particularly the former. Probably better known under the name *Lycoperdon depressum* Bon. Records extend from the Punjab to Europe.

Nidulariaceae

Cyathus striatus Huds. ex Pers.

Turkey: Trabzon, loc. 292, ca. 2 km S of Hamsiköy, ca. 80 km SW of Trabzon on the road to Gümüşhane, rather dry *Picea* forest on steep N facing slope, 2360 m, 23.VIII. 1972 Uotila 19743; Bolu, loc. 313, Uotila 20075; Istanbul, loc. 317, margin of spring, bare ground, Uotila 20208.

A widespread and common fungus growing on twigs and leaf litter in frondose woodland in temperate areas. Lloyd (1906) records it only from Europe and N America but Brodie (1975) records it from India, Japan, China and Mexico. The Turkish material agrees with European collections more than with those from N America. The basidiospores are characteristically ellipsoid, thick-walled, slightly narrowed and with a notch at one end.

Secotiaceae

Montagnea arenaria (DC.) Zeller

Iran: Khorasan, loc. 100, 15 km NW of Tayebat on road Mashhad-Tayyebat, sandy steppe, 870 m, 4.V. 1972 Korhonen 1131.

A very common fungus throughout the warmer drier parts of the world, preferring sandy deserts; it is also found in cultivated fields. Petrák (1949,

under *Montagnites*) records it from Iran. Dring & Rayss (1964) record it from Israel; Eckblad (1970) records it from Iraq and Afghanistan, and mentions several other places with author references.

During the curation of the material in E a collection of this fungus was identified from the Near East:

Turkey: On coastal sand-dunes in community of succulent *Convolvulus*, Manavgat (Davis 35724) legit T. Dudley.

Podaxis pistillaris (L. ex Pers.) Morse emend.

Afghanistan: Balkh, loc. 137, 12 km N of Khairabad, ca. 40 km N of Mazar-i-Sharif, sand dunes in the Amu-Darya valley, 290 m, 16.V.1972 Uotila 16836. — Iran: Khorasan, loc. 100, 15 km NW of Tayyebat on road Mashhad-Tayyebat, sandy steppe, 870 m, 4.V.1972 Korhonen 1131.

A most common species in the warmer and drier parts of the world. It is recorded from Iraq and Afghanistan (Eckblad 1970), Israel (Dring & Rayss 1964), Karsorkhstan (Švarcman 1959), Tadjikistan (Pilát 1965) and Turkmenistan (Kalymbetov 1956), from Kashmir (Hongo 1965) and Pakistan (Ahmad 1952). Eckblad (1970) states 'curiously enough this species is still unknown from Iran which probably only reflects the incompleteness of our data from these regions'. We agree entirely and along with his recent record (Eckblad 1976) we place this species as an established member of the flora of Iran.

Whilst this survey was under way specimens were also received from the Persian Gulf:

Kuwait: University Gardens, ground treated with organic fertilizers, V.1972 Moustafa 3.

Tulostomataceae

Phellorina herculeana (Pallas ex Pers.) Kreisel

Afghanistan: Balkh, loc. 139, Rabat-i-Payan village ca. 15 km S of Balkh, semi-desert, 430 m, 17.V.1972 Korhonen 1139.

This species is fairly common in dry warmer regions of the world. Eckblad (1970) records this from Iraq and mentions several other localities including Afghanistan (Aitchison 1888, Lange 1953). Probably better known under the name *P. inquinans* Berk. The material agrees because of the presence of imbricate scales with var. *herculeana*.

Schizostoma lacerata (Ehrb. apud Fr.) Lév.

Iran: Ostanemarkazi, loc. 79, 30 km SEE of Tehran by Khorasan road, Mamasan, margin of wheat field, gravel desert, 1140 m, 25.IV. 1972 Uotila 15825.

A widely distributed fungus of sandy deserts and steppe land; recorded from Africa, Asia, the New World and Australia. Noted for the Punjab (Ahmad 1941) and European U.S.S.R. (Pilát 1958) but apparently new to Iran.

Appendix

Morchellaceae

Morchella esculenta Pers. ex St. Amans

Turkey: Edirne, loc. 50, Kesan, ca. 10 km W of road crossing to Canakkale on the E5 S, sands of roadside meadows, 8.IV.1972 Uotila 15370.

A widespread spring fungus, sought after as a great delicacy throughout Europe, N America etc. A very variable fungus which has been split into several 'micro-species'.

Xylariaceae

Hypoxylon cf. *sassafras* (Schw. ex Fr.) Curt.

Iran: Mazandaran, loc. 251, ca. 65 km E of Gorgan along the highway, dense mixed deciduous forest by the road, 70 m, 6.VIII. 1972 Uotila 19205.

Apparently unrecorded from Iran, although found in North and South America, it is also recorded from Italy and China.

Addendum

Hypoxylon ? howeianum Peck

Iran: Mazandaran, Elburz Mts., Golban foest, on dead wood(log), 1200 m, Walton 281 (in E).

Similar in size and structure to immature *Daldinia vernicosa* (Schw.) Ges. & de Not., a name often considered synonymous with *D. concentrica* (Bolt. ex Fr.) Ces. & de Not. and under which name it was recorded by Watling & Sweeney (1975). We are indebted to Dr. A.J.S. Whalley for his opinion on this collection.

References

- Ahmad, Sultan** 1941: High fungi of the Punjab Plains 2. The Gasteromycetes. — *J. Indian Bot. Soc.* 20: 135—143.
- » -1942: Gasteromycetes of the Western Himalayas 2. — *J. Indian Bot. Soc.* 21: 283—293.
- » -1952: Gasteromycetes of West Pakistan. — *Publ. Dept. Bot. Univ. Punjab* 26: 1—92.
- Aitchison, J.E.T.** 1888: The botany of the Afghan delimitation commission. — *Trans. Linn. Soc. London Sec., Ser. Bot.* 3: 1—40.
- Alessio, C.L.** 1976: Un fungo assai raro: il *Leucopaxillus* (*Tricholoma*) *macrocephalus* (Schulz.) Bohus. — *Micologia Italiana* 5(1): 8—14.
- Bas, C.** 1960: Notes on Agaricales 2. — *Persoonia* 1: 301—314.
- Binyamini, N.** 1973: Boletaceae of Israel 2. *Gyroporus*, *Xerocomus* and *Boletus*. — *Trans. British Mycol. Soc.* 60: 99—105.
- » -1974: Fleshy fungi of North and Central Israel 1. — *Israel J. Bot.* 23: 237—251.
- » -1976: Fleshy fungi of North and Central Israel 2. — *Israel J. Bot.* 25: 62—78.
- Bon, M.** 1964: Trois Lactaires du groupe des Fuliginosi. — *Bull. Soc. Mycol. France* 80, Atlas pl. 144, 145, 146.
- Bon, M. & Boiffard, J.** 1972: *Lepiotes* des dunes Vendéennes. — *Bull. Soc. Mycol. France* 88: 15—28.
- Brodie, H.J.** 1975: The bird's nest fungi. — 199 pp. Toronto.
- Corner, E.J.H.** 1966: A monograph of *Clavaria* and allied genera. — 740 pp. London.
- Dennis, R.W.G., Orton, P.D. & Hora, F.B.** 1960: New check list of British Agarics and Boleti. — *Trans. British Mycol. Soc.* 43(suppl.): 1—225.
- Dring, D.M. & Rayss, T.** 1963: The Gasteromycete fungi of Israel. — *Israel J. Bot.* 12: 147—178.
- Eckblad, F.-E.** 1970: Gasteromycetes from Iraq, Iran and Afghanistan. — *Norwegian J. Bot.* 17: 129—138.
- » -1976: Contributions to the gasteromycet-flora of Iran. — *Iranian J. Bot.* 1(1): 65—69.
- Heinemann, P.** 1958: Champignons recoltés au Congo Belge par Madam M. Goosens-Fontana 3. *Cantharellineae*. — *Bull. Jard. Bot. de l'Etat Bruxelles* 28: 385—438.
- von Höhnelt, F.** 1905: Pilze. In: Ergebnisse einer naturwissenschaftlichen Reise zum Erdschias Dagh (Kleinasien), ausgeführt von Dr. A. Penther und Dr. E. Zederbauer. — *Ann. Naturhist. Hofmus. Wien* 20: 346—369.
- Hongo, T.** 1965: Fungi of Hidukush collected by Mr K. Honda. — *Acta Phytotax. Geobot.* 21: 117—118.
- Josserand, M.** 1974: Une nouvelle espèce de *Lepiote* rougissante: *Lepiota jubilaei*, petite étude du groupe. — *Bull. Soc. Linn. Lyon* 43 (num. spécial): 205—216.
- Kalymbetov, B.K.** 1956: Mikoflora jugo-zapadnoi Turkmenii. — *Trudy Bot. Inst. Akad. Nauk SSSR*, ser. 2, 11: 175—312.
- Konrad, P. & Maublanc, A.** 1924—1935: *Icones selectae fungorum*. — 558 pp. Paris.
- Kreisel, H.** 1967: Taxonomisch-pflanzengeographische Monographie der Gattung *Bovista*. — *Beih. Nova Hedwigia* 25: 1—244.
- Kühner, R.** 1933: Notes sur le genre *Inocybe* 1. Les *Inocybes* goniospores. — *Bull. Soc. Mycol. France* 49: 81—121.
- Kühner, R. & Romagnesi, H.** 1953: Flore analytique des champignons supérieurs. — 557 pp. Paris.
- Kukkonen, I. & Uotila, P.** 1976: Finnish botanical expedition to West-Central Asia in 1972. — Pamphlet Bot. Mus. Univ. Helsinki 7: 1—21.
- Lange, J.** 1935—1940: *Flora Agaricina Danica*. — 515 pp. Copenhagen.
- Lange, M.** 1953: Some Gasteromycetes from Afghanistan. — *Bot. Tidsskr.* 50: 79—80.
- Lloyd, C.G.** 1906: The *Nidulariaceae*. — *Mycol. Writ.* 2: 1—30.
- Maas Geesteranus, R.A.** 1975: Die terrestrischen Stachelpilze Europas, — 127 pp. Amsterdam.
- Maire, R.** 1924: Etudes mycologiques (Fasc. 2). — *Bull. Soc. Mycol. France* 40: 293—317.
- Moser, M.** 1967: Kleine Kryptogamenflora. IIb/2, Basidiomyceten 2. Die Röhrlinge und Blätterpilze. — 443 pp. Stuttgart.
- Niemelä, T. & Uotila, P.** 1977: Lignicolous macrofungi from Turkey and Iran. — *Karstenia* 17: 33—39.
- Orton, P.D.** 1960: New check list of British Agarics and Boleti 4. Notes on genera and species in the list. — *Trans. British Mycol. Soc.* 43: 159—439.
- Petrak, F.** 1949: Beiträge zur Pilzflora Irans. — *Sydowia, Ann. Mycol.* 3: 268—332.
- Pilát, A.** 1937: Additamenta ad floram Asiae Minoris Hymenomycetum et Gasteromycetum, pars quarta (1). — *Bull. Soc. Mycol. France* 53: 253—264.
- » -1958: Gasteromycetes. Houby-břichatky. In: *Flora CSR*, ser. B, 1. — 862 pp. Praha.
- » -1965: Die Pilze Zentralasiens. — *Schweiz. Z. Pilzkunde* 43: 49—58.
- Romagnesi, H.** 1967: Les Russules d'Europe et d'Afrique du nord. — 998 pp. Bordas.
- Schaeffer, J.** 1952: *Russula* Monographie. In: *Die Pilze Mitteleuropas* 3. — 296 pp. Bad Heilbrunn.
- Singer, R.** 1975: The Agaricales in modern taxonomy. — 912 pp. Vaduz.
- Smith, A.H. & Thiers, H.D.** 1971: The Boletes of Michigan. — 428 pp. Ann Arbor.
- Švarcman, S.R.** 1959: Materialy k flore gasteromicetov Kazachstana. — *Trudy Bot. Inst. Akad. Nauk Kazachskoj SSR* 7: 227—267.
- van Waveren, K.** 1972: Notes on the genus *Psathyrella* 3. Unorthodox approach and key to section *Atomatae*. — *Persoonia* 7: 23—54.
- Watling, R.** 1970: British fungus flora. Agarics and Boleti 1. Boletaceae, Gomphidiaceae, Paxillaceae. — 125 pp. Edinburgh.
- Watling, R. & Sweeney, J.** 1974: Larger fungi from Iran. — *Notes R. Bot. Garden Edinburgh* 33: 333—339.

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