The Gasteromycetes of the Åland Islands, SW Finland: an annotated checklist

CARL-ADAM HÄGGSTRÖM


Both herbarium specimens and published data on the Gasteromycetes s.l. of the Åland Islands are treated. Altogether, 37 species have been reported which is a little more than half of the total species number of Finland. Seven species, namely Bovista nigrescens, B. plumbea, Calvatia excipuliformis, C. utriformis, Lycoperdon perlatum, L. pyriforme and Phallus impudicus seem to be common or fairly common in the Åland Islands. Eight species, viz. Geastrum elegans, G. floriforme, G. schmidelii, G. striatum, Langermannia gigantea, Lycoperdon echinatum, Melanogaster ambiguus and Telostoma brumale are listed as threatened in Åland.

Key words: Åland Islands, checklist, Finland, Gasteromycetes

Carl-Adam Hæggström, Department of Ecology and Systematics, P.O. Box 7, FIN-00014 University of Helsinki, Finland

Introduction

The written knowledge of the Gasteromycetes of the Åland Islands has hitherto been both scattered and rather insignificant. In his papers on Basidiomycetes of Finland, P.A. Karsten (1889, 1893, 1898) enumerates 27 species, some of them dubious, or defined differently than now, of the Gasteromycetes s.l. found within the present boundaries of Finland; none of them were mentioned to occur in Åland.

Ulvinen (1976) enumerated 50 species of Gasteromycetes s.l. found in Finland. Three further species, whose status in Finland was uncertain, were also included. Since then, several more species have been found and the total number of Gasteromycetes s.l. species found in Finland is now about 70.

This paper deals with the Gasteromycetes s.l. found in the Åland Islands. In preparing the paper, I have studied all available herbarium specimens collected in Åland, except for a few Geastrum specimens in the herbarium of Dr. Stellan Sunhede which are treated in detail in his doctoral thesis (Sunhede 1989). Besides my own collections (included in H), I have obtained specimens from the following herbaria: H, OULU, TUR, TURA and UPS. No specimens were sent from GB, KUO, LD and S. Furthermore, I have tried to find published information on Gasteromycetes from Åland.

Older published data are rarely accompanied by preserved material in herbaria. Therefore, published information on certain species may contain wrong determinations regarding the species. Lacking methods for controlling such cases, I decided to report this information according to the original papers. A few of the determinations are obviously wrong and these are discussed in each case. Some of the herbarium specimens were too young to identify their species, or even their genus.

Microscopic characters were studied in most herbarium specimens, among others all those be-
longing to Lycoperdaceae. The spores and capitillar hyphae were studied both in lactophenol with or without cotton blue and Melzer’s reagent. The tiny warts or spines of *Lycoperdon* and *Bovista* spores were better seen using Melzer’s reagent.

The Åland Islands

The Åland Islands comprise an archipelago of more than 6 000 islands at the edge of the northern Baltic Sea. Biogeographically this archipelago belongs to the hemiboreal zone (Ahti et al. 1968). The bedrock mostly consists of acid rapakivi granite and other granites and of gneisses, too (Hausen 1964). The soil is rich in calcium because of the Ordovician limestone which originates from the bottom of the Bothnian Sea and Lumparn Bay (Brenner 1930, Hausen 1964). Due to this calcium-rich soil and the fairly favourable climate, the vegetation is in many places luxuriant and rich in species. The calcicolous element of both fungi and plants is prominent. Many species grow here at their northernmost limits in the Baltic Sea area. The influence of man upon nature has been intense, although pasturing activities have been reduced during this century. However, grazing in woods and semi-natural habitats, such as wooded meadows, wooded pastures and seashore meadows, is much more common in Åland than in other parts of Finland.

Knowledge of the Gasteromycetes of the Åland Islands was built up slowly. By 1930 only three species were known from this area. Due to the efforts of Ole Eklund, Ernst Häyrén, Lauri E. Kari, Carl Th. Mörner and Göran Stenlid, six new Åland species were found during the 1930s. One further species, *Geastrum pectinatum* was probably also found during this period, because a note on its occurrence in the Åland Islands was published by Ingelström (1940).

During the 1940s several persons (mostly the same as during the 1930s and Otto von Schulmann) contributed to our knowledge of the Ålandian Gasteromycete flora. Twelve or thirteen new species were found.

During the following two decades a slight decline in collecting activity occurred. Only four new species were found. During the 1970s and 1980s, attention was again paid to the fungi of Åland. This is partly the result of the efforts of the present author, who collected Gasteromycetes whenever he found them. Also, many other persons collected Gasteromycetes. These efforts contributed eleven new species of the Ålandian Gasteromycete flora.

In the mid 1990s 37 species had been reported from the Åland Islands. This is a little more than half of the total species number of Finland. Several Gasteromycete species found in other parts of Finland, have eluded the collector’s eye in Åland. This regards especially the hypogeous genus *Hymenogaster* and some *Bovista* species, particularly *B. paludosa* Lév. which presumably may be present in some of the Ålandian rich fens.

The investigation of the Ålandian Gasteromycete flora

The first piece of information regarding Gasteromycetes in Åland is the specimen of *Lycoperdon pyriforme* collected in the commune of Jomala by P.A. Karsten in 1881 (H). He did not, however, mention this record in his papers (Karsten 1889, 1893, 1898). Therefore, the first published information is a short note on *Phallus impudicus* (Elfving 1907) based on specimens collected in 1906 in Jomala (at least three collections in H; cf. Luther 1947a). Two more short notes on the same species were published by Brenner (1908) and Palmgren (1908).

List of taxa

The communes are abbreviated: Br = Brändö, Ec = Eckerö, Fi = Finström, Fö = Föglö, Ge = Geta, Ha = Hammarland, Jo = Jomala, Kö = Kökar, Ku = Kumlinge, Le = Lemland, Ma = Mariehamn, Sa = Saltvik, So = Sottunga, Su = Sund, Vå = Vårdö. Whenever possible, the coordinates according to the Finnish uniform grid system (Grid 27° E) are given with an accuracy of 10 km (3 + 2 numbers), or 1 km (4 + 3 numbers). Some information is too general for determining accurate co-ordinates.
Lycoperdales
Geastraceae


Geastrum fimbriatum Fr. — Recorded seven times (Ec, Fi, Jo, Le, Su and Vå; H, TURA, UPS). First record: Ec: Torp, S of Skeppsvik, beneath a hazel shrub (669:08), 18.VI.1945, G. Stenlid (H). According to Stenlid (1947), the date was 20.VI.1945. — The species was found in deciduous stands, under a spruce and in a pine wood on sandy soil with the quite high pH of 6.8 (Huhtinen 1992). Three of the finds were from the calcareous area of Lumparn Bay. — Literature: Stenlid (1947), Huhtinen (1992).


Geastrum pectinatum Pers. — Recorded 13 times (Jo, Le and Vå; H, OULU, TUR, UPS, herb. Sunhede). First record: Åland according to N. Stenlid (Ingelström 1940). — This species was mostly found in spruce woods. It usually grows in the needle litter, or on abandoned or dying ant-hills. A few finds were from luxuriant deciduous stands. All finds except two were located on the two adjacent islands Nåtö and Järsö in Le. — Literature: Ingelström (1940), von Schulmann (1961), Sunhede (1989).

Geastrum quadrifidum Pers.: Pers. — Recorded 14 times (Ec, Le and Vå; H, TUR, UPS). First record: Le: Nåtö (667:10 or 668:10), 16.VI.1946 (Stenlid 1947). — The species was recorded in mixed or spruce woods. The localities were often rather moist. One find was on an abandoned ant-hill. — Literature: Stenlid (1947), von Schulmann (1958, 1961).


Bovista pusilliformis (Kreisel) Kreisel — Only found twice. First record: Le: Nåtö, in a wooded meadow about 200 m E of Norrbacka (6680:109), 22.VIII.1971, C.-A. Håggström (H). — Each collection consists of one somewhat unripe fruit body, but the microscopical characters are typical of *B. pusilliformis* as described by Kreisel (1962, 1967). Especially the numerous minute pores and amphiseptal branching of the capillitial hyphae are characteristic features of this species as described by Kreisel (1962, 1967). According to Mr. M. Jeppson (Trollhättan, Sweden, letter in 1990), both specimens belong to *B. aestivalis* (Bonord.) Demoulin (Demoulin 1979). This species has a rather variable morphology, for instance capillitial hyphae with small and large pores, and a wide ecological amplitude occurring on dry open sandy soil, or on mull and clayey soils in deciduous woods. In my opinion, the variability both in morphology and ecology of *B. aestivalis* sensu Demoulin seems to be too great to make it a single species. Therefore, in accordance with Kreisel (1962, 1967, 1987) and Gross et al. (1980), I consider *B. pusilliformis* (Kreisel) Kreisel as a distinct species (cf. also Pegler et al. 1995). — Literature: Håggström (1997).

Bovista nigrescens Pers.: Pers. — Recorded 20 times (Ec, Fi, Kö, Le and Sa; H, TUR). First record: Ec: Storby, hillock with junipers (670:08), 13.VII.1935, E. Häyrén (H; confirm. F.-E. Eckblad 1963). — This species was often found in grazed meadows and pastures. Other localities are hazel stands, deciduous and mixed woods, on the spruce needle mat under a large

*Bovista plumbea* Pers.: Pers. — Recorded 31 times (Br, Ec, Fi, Ge, Jo, Ku, Kô, Le, Sa and Su; H, TUR, TURA). First record: Ec, 15.VIII.1937, A. Södergård (H; det. C.-A. Håggström 1990). — This species was found on open ground in pastures, at roadsides and in lawns. It is often found together with *B. nigrescens*. — Literature: Eklund (1943), Stenlid (1947), von Schulmann (1955).

*Bovista dermoanthes* Vittad. (syn. *B. pusilla* (Batsch) Pers.) — Stenlid (1947) reported two finds of *Lycoperdon pusillum* from Le. Specimens in UPS from one of the localities belong to *Bovista limosa* (see below). The other find from the island of Kungsholm (6685-6:114), 20.IX.1946 (Stenlid 1947) may perhaps refer to *B. limosa*, or some other *Bovista* or *Lycoperdon* species. As no herbarium specimen is available its affiliation to the species cannot be verified. — Literature: Stenlid (1947).


*Calvatia excipuliformis* (Pers.) Perdeck — Recorded 16 times (Ec, Fi, Fô, Jo, Le and Ma; H, TUR, TURA). First record: Jo: Hammarudda, a meadow near the seashore (668:09), 23.VI.1949, E. Häyrén (H; det N. Malmström). — This species was found in dry and mesic meadows and in deciduous woods. — Literature: von Schulmann (1955, 1958, 1961).


*Langermannia gigantea* (Batsch; Pers.) Rostk. — Recorded three times (Br, Ec and Ge). First record: Br: Fiskö, Storholrm, possibly 6.VIII.1934, O. Eklund (Luther 1947a). — Although no herbarium specimens are preserved, the determination of this easily recognisable species is almost certain, especially regarding the two finds of the 1980s, which were reported with photographs in the daily press. — Literature: Luther (1947a), Ahti & Korhonen (1974), Södergårdh (1980, 1987), Tuominen (1987), Ulvinen (1994).


*Lycoperdon ericaeum* Bonord. var. ericaeum — Recorded 8 times (Le and Su; H). First record: Le: Nätô, on a flat rock outcrop by the midsummer pole (6680:109), 22.V.1984, C.-A. Håggström 4754 (H). — This species was found in rock meadows and other dry meadows. One fruit body was also found on rather dry soil in a light deciduous wood.

*Lycoperdon lividum* Pers. — Recorded 8 times (Fi, Fo, Le and Su; H). First record: Su: Kastelholm, in a meadow at Jan Karlsgården on the slope towards the seashore (6700:117), 2.X.1982, C.-A. Håggström 3900a (H). — The species was found in dry meadows.

*Lycoperdon molle* Pers.: Pers. — Recorded three times (Ha and Le; H, OULU, TUR. First record: Le: Nätô, Eskskår (6679:105–6), 3.IX.1949, L.E. Kari (TUR; det. group *molle* by V. Demoulin 1969; det C.-A. Håggström 1990). — This species was found in deciduous or mixed woods and on a rocky slope in a cut forest.

*Lycoperdon nigrescens* Pers. — Only recorded twice (Le and So; H). First record: So: Norra byn, mixed forest (668:14), 10.VIII.1974, Å. Nordström 311 (H; det. C.-A. Håggström 1990). — The species was found in a mixed forest and in a dry meadow.
**Lycoperdon perlatum** Pers.: Pers. — Recorded 43 times (Ec, Fi, Fö, Ha, Jo, Le, Sa and Vä; H, TUR, TURA). First record: Ec: Storby, spruce wood, 12.VII.1935, Ernst Häyrén (H; det. W. Nyberg; det. V. Demoulin 1974). — This is one of the most common gasteromycete species in Åland. It was found growing among mosses and in the litter in mixed woods with pine and spruce, spruce woods, mixed woods (often below *Populus tremula*), deciduous woods with ash, birch, oak and hazel, and further on thin humus on rock outcrops, on decaying wood at a roadside, and even on the gravel at roadsides. — Literature: Stenlid (1947), von Schulmann (1955).

**Lycoperdon pyriforme** Schaeff.: Pers. — Recorded 42 times (Ec, Fi, Ha, Jo, Le, Ma and Vä; H, TUR, TURA). First record: Jo, 1.IX.1881, P.A. Karsten (H; det. P.A. Karsten 1883; det. V. Demoulin 1976). — Together with *L. perlatum* one of the most common gasteromycete species in Åland. It is associated with decaying wood, visible or buried in the soil. Of its substrates the following may be mentioned: in cracks and on decaying parts of living trunks of *Fraxinus excelsior, Malus sylvestris, Sorbus hybridra* and *Tilia cordata* and on stumps and dead trunks of *Alnus glutinosa, Betula sp., Fraxinus excelsior* and *Quercus robur*. A few roadside finds were also made.


**Vascellum pratense** (Pers.: Pers.) Kreisel — Recorded six times (Ec, Jo and Su; H, TURA). First record: Su: Kastelholm, in a meadow at Jan Karlgården on the slope towards the seashore (6700:117), 2.X.1982, C.-A.Heggström 3990b (H). — This species was found in rock meadows and other dry meadows.

**Mycenastraceae**


**Melanogastrales**

**Melanogastraceae**


**Nidulariales**

**Nidulariaceae**

**Crucibulum laeve** (Huds.) Kambly — Recorded 10 times (Kö, Le and Vä; H). First record: Le: Nätö (667–8:10), 13.IX.1946 (Stenlid 1947). — This species was found on decaying twigs of *Alnus glutinosa* and *Corylus avellana*, on the trunk of an old apple tree, on the spruce needle mat in a spruce wood, and on the gravelly soil at a car parking place. — Literature: Stenlid (1947).


**Cyathus striatus** (Huds.) Pers. — Recorded 7 times (Ha, Jo, Le and Su; H, TUR, UPS). First record: Le: Flaka, Apalholmens (667:11), 19.IX.1946. G. Stenlid (UPS; confirm C.-A. Heggström 1996; according to Stenlid (1947), the habitat was on the soil in a dense hazel stand). — The species was mostly found on decaying wood (e.g. *Alnus glutinosa*). — Literature: Stenlid (1947), von Schulmann (1961).

Sphaerobolaceae


Phallales

Phallaceae

*Phallus impudicus* L.: Pers. — Recorded 40 times (Br, Ec, Fi, Fö, Ge, Ha, Jo, Ku, Le and Su; H, TUR, TURA). First records: Jo, 1906, H. Snellman (H; confirm. C.-A. Hæggström 1989) and Fö: Näfversholm, 1906 (Brenner 1908). — The common stinkhorn has attracted the attention of botanists and laymen for most of this century. Therefore, it is the most frequently reported species in the literature. This fungus has been often found in luxuriant deciduous woods and wooded meadows. It has also been found in spruce woods, a mixed pine wood and in a lawn. — Literature: Elfving (1907), Brenner (1908), Palmgren (1908, 1921), Suomalainen (1916), Lindberg (1921), Hintikka (1931, 1933), Häyrén (1944), Luther (1947a, 1947b), Stenlid (1947), Södergård (1948), von Schulmann (1955, 1961), Eklund (1958), Tuomikoski (1959), Lange (1974), Ulvinen (1976), Hæggström (1981, 1996), Becker (1983), Svrček (1983), Härkönen (1984), Ryman & Holmåsen (1984), Andersson (1989) and Korhonen (without year).

Sclerodermatales

Sclerodermataceae


According to von Schulmann (1961) an unknown *Scleroderma* species was found by him in Mariehamn: Ytternäs in 1958. The collected fruit bodies in H represent, however, the ascomycete *Elaphomyces asperulus* Vittad. (det. C.-A. Hæggström 1989).

Tulostomatales

Tulostomataceae


Boletales

Rhizopogonaceae


*Rhizopogon roseolus* (Corda) Th. Fries. — Only recorded twice (Ec, Sa). First record: Ec, 1948 (von Schulmann 1955, 1961). — It is doubtful whether *Rhizopogon roseolus* belongs to the my­coflora of Finland (Eckblad & Lange 1992). The specimens found by von Schulmann may per­haps belong to *Rhizopogon rubescens* Tul., which is fairly common in Finland (Ulvinen 1976, Eckblad & Lange 1992). Most of the Finnish specimens named *R. rubescens* were re­cently determined as *R. vulgaris* (Vittad.) M. Lange by Maria P. Martin (Barcelona; Spain). She regards *R. roseolus* as synonymous with *R. rubescens*.

Concluding remarks

The Gasteromycete flora of Åland is fairly rich in these species. The majority of the species are found in seminatural habitats such as wooded meadows and pastures of different kinds. The following seven species seem to be common, or fairly common in the Åland Islands: *Bovista nigrescens*, *B. plumbea*, *Calvatia excipuliformis*,
C. utriformis, Lycoperdon perlatum, L. pyriforme and Phallus impudicus. Several species are obviously rare, but among those which have been found only once or twice, some may be quite common. They have apparently eluded the collectors, because of their small size, e.g. Nidularia deformis and Sphaerobolus stellatus. The following 12 (or 13) species have been recorded only once: Geastrum elegans, G. floriforme, G. schmiedii, G. striatum, Bovista dermoxantha (dubious), B. limosa, Lycoperdon echinatum, Mycenastrum corium, Melanogaster ambiguus, Cyathus olla, Nidularia deformis, Sphaerobolus stellatus and Tulostoma brumale.

The following gasteromycete species are listed as threatened in Åland (Rassi et al. 1992, Ulvinen 1994):
- endangered: Geastrum elegans, G. floriforme, G. schmiedii
- vulnerable: Geastrum striatum, Lycoperdon echinatum
- in need of monitoring, rare: Langemannia gigantea
- in need of monitoring, insufficiently known: Melanogaster ambiguus, Tulostoma brumale

Gasteromycetes have been found in all the Alandian communes, with the exception of Lumparland. Specimens have been collected rather irregularly and from half of the communes only one to six collections are preserved in the herbaria. Surprisingly, the mainland communes of Hammarland, Geta and Saltvik belong to these inadequately known communes. The only communes with at least 20 collections are Eckero, Jomala, Finstrom and Lemland. The rather large number (139) of collections in Lemland is partly due to the fact that some areas of the commune were quite thoroughly investigated by Göran Stenlid during the 1940s and since 1964 by several persons, among them the author, working at the Nätö Biological Station. In fact, only a very few areas in Åland have been fairly closely investigated, among these areas are Storby in Eckero and Nätö, Apalholmen and Herrö in Lemland.

Acknowledgements. My sincere thanks are due to the keepers of the herbaria mentioned, to Dr. Stellan Sunhede for information on the Geastrum species, and to Dr. Tauno Ulvinen, with whom I have had several fruitful and interesting discussions on fungi.

References

Received on 21 February 1996