

The Finnish Hemiptera Recording Scheme

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Abstract

Records of Finnish natural museum collections and inventories have been digitized as a modern Recording Scheme consisting of over 100,000 records. The database has been developed with GIS –based distribution maps providing a valuable methodological advancement for creating two new Hemiptera identification guides “Aphids of Finland and its adjacent regions” and “True Bugs of Finland”. The present information basis is considered sufficient also for the next national red-listing of species (due by 2010) which may include all species groups excluding insects.

Key words: Hemiptera recording scheme, Red-List of Hemiptera species, Hemiptera identification guides.

Introduction

Despite its many internationally reputed hemipterologists, the knowledge of Finland’s own Hemiptera fauna has remained at a modest level. This insufficiency has been acknowledged in repeated assessments of nationally threatened species, latest in year 2000. To counteract this deficiency an Expert Group on Hemiptera was established in late 2001 bringing together active experts from a variety of instances. The ten man strong group works with evaluation of conservation status of species and promotes conservation and habitat management of sites with threatened species. One of the main operative targets since 2002 has been the establishment of a National Hemiptera Recording Scheme which would bring together old and new data on the occurrence of the species. The goal has been to digitize collection material, promote and carry out new field surveys and to make research into the biology of the species. Focus has been set on making atlas information freely available on the web for authorities in need to improve conservation status assessments, researchers looking into dynamic changes in faunistics, and amateurs interested in this insect order. Because of the present-day relatively low tractability to collect Hemiptera, new books are being prepared for some groups, such as true bugs and aphids, where the international market of identification guides is still low. These identification guides are seen as essential tools for maintaining the recording scheme in the long term.

Materials and methods

In creating the Recording Scheme the 1st stage has been to digitize the records of the main museum collections (Helsinki, Turku, Oulu and Jyväskylä) and the private collections of the members of the Expert Group. The oldest museum material goes back to the late 19th century and is in many ways incomplete. In the 2nd stage, records from extensive inventories of eskers, high value grasslands, mires and forests made by the Finnish Environment Institute, the Regional Environment Centres

and the Finnish Forest and Park Service have been collected. These surveys have been made in both nature conservation areas as outside them using a variety of collection methods such as Malaise-traps, yellow colour traps, pitfall traps and light traps besides active sweep-net sampling. In the 3rd stage, which has begun quite recently, a long-term inventory is planned that would target the most of the incompletely surveyed areas in Finland.

The datafiles have been fed into central databases at the Zoological Museum of Turku. For visualization of the data on a 10 x 10 km grid, programmes have been developed converting both spatial and temporal information to postscript maps and further to pdf-files with Ghostscript. This GIS-based concept provides a valuable methodological advancement for creating both modern guide books and www–extensions.

Two new Hemiptera identification guides are in preparation as parts of the current Finnish biodiversity research program. The projects “Aphids of Finland and its adjacent regions” and “True Bugs of Finland” are both financed by the Finnish Ministry of Environment. Both projects will capitalize on the vast amount of new records, e.g. ca 10,000 new records per year of true bugs over the last three years. The new books will thus contain digitally edited distribution maps of all species and, in addition to identification keys, also high quality digital portraits of fresh material or pictures of many species in their natural environment.

Results and discussion

The Finnish Hemiptera Recording Scheme is at present the most comprehensive scheme in Europe (table 1), although, the base mapping in the different groups, except Auchenorrhyncha and Aphidoidea, is still not completed. The completion for the total estimated existing 120,000 records is scheduled for year 2008, after which regular annual updates will commence. Other ongoing recording schemes in Europe are slightly more small-scaled, like the Heteroptera of Slovenia, aquatic bugs of UK, Auchenorrhyncha of Luxemburg and Germany.

Table 1. Number of Finnish Hemiptera species and their increase over the last 22 years, including records held in the Finnish Hemiptera database by May 15, 2007.

Group	Species 2006	Increase 1984→2006	Records
Heteroptera	498	4.4%	59,734
Auchenorrhyncha	392	29.3%	37,159
Psylloidea	88	10.0%	3,271
Aphidoidea	465	52.3%	18,218
Aleyrodoidea	12	0.0%	126
Coccoidea	22	10.0%	77
Hemiptera total	1,475	22.4%	118,585

The parallel efforts in taxonomic research of Finnish species have substantially increased the knowledge of the fauna (Albrecht *et al.* 2003; 2006) (table 1). The highest research deficiency is in the scales, which no one has focused on for many decades.

Producing the species maps on the web has increased voluntary sampling and recording of Hemiptera in Finland, especially for areas which appear non-surveyed. The forthcoming identification guides are expected to still increase voluntary work in this group. The present information basis is considered sufficient for the next national red-listing of species (due 2010) which may include all species groups excluding the scales. Intermit- tent assessments of some groups (Söderman, 2007) have already shown that the portion of earlier data deficient/not evaluated species may be reduced to less than 5%.

Conclusion

The Finnish Hemiptera Recording Scheme may serve as a pilot for similar efforts in other European countries. The creation of national Hemiptera Recording Schemes in other countries is strongly encouraged. In the long run this may present concerted opportunities to analyze large scaled changes in species distribution patterns caused by changes in land use or accentuated by climate change, and, ultimately perhaps, production of a European Red-List of Hemiptera Species.

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