An inventory of the coleopterous summer-fauna of subterranean mole-runs in a Danish forest

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Introduction

In 1962 I happened to spend a few summer-weeks at Nivå (north of Copenhagen) and then took an inventory of the coleopterous fauna of some mole-runs in a small and middle-aged forest called Kildehøj Skov. The investigation was on a small scale and, according to previous experiences, the season was among the least suitable in so far as the summer fauna of the subterranean galleries is relatively poor regarding the more eucoenic species in particular. Since no similar investigations seem to have been published before from Denmark the results may still be of some interest.

Kildehøj Skov is an old park composed of various species of deciduous trees. Most places were shady. The humus layer was of considerably thickness. Ten days out of thirty were more or less rainy and the earth was constantly kept moist. Mole's tunnels were numerous and easily found by the earth giving away there when trodden on. Dead moles (*Talpa europaea* L.) were occasionally found on the ground.

Methods

Pits were dug in the bottom of tunnels mostly far from any noticeable entrance but in a few cases under decaying stumps of trees. Glasses with their mouths covered with fastened wide-meshed iron nets were put down into the pits. Earth was packed around the glasses so that their mouths were on a level with the bottom of the tunnels. The openings were covered with a piece of mill-board and the latter in its turn with some earth and finaly with leaf-litter. The places were carefully marked in order to ensure refinding.

Usually next day, sometimes at intervals of two or three days, the glasses were dug up, emptied and replaced. The captures of the different glasses were as a rule not kept apart. Numerous larvae were found but had to be left unconsidered. Only imagines were counted.

List of species

The systematic sequence and nomenclature follow Lindroth (1960) with a few exceptions. The numerals in parenthesis indicate the number of

examples found in the periods July 12—31 and August 1—14 respectively. The coenological groups to which the species are assigned (see below) are marked by a numeral after a hyphen. In total 61 species and 246 specimens were noticed.

Carabidae

Carabus hortensis L. (0; 1) - 3
Leistus rufomarginatus Dft. (4; 0) - 3
Nebria brevicollis F. (1; 0) - 3
Trechus micros Hbst (0; 1) -2
— *secalis* Panz. (0; 1) - 3
Patrobus atrorufus Ström (1; 0) - 2
Badister sodalis Dft. (1; 0) - 3
Amara brunnea Gyll. (0; 1) - 3
Stomis pumicatus Panz. (3; 2) - 3
Pterostichus melanarius Ill. (0; 8) - 2
— *niger* Schall. (1; 1) - 2
Abax ater Villers (1; 0) - 3
Synuchus nivalis Panz. (0; 1) - 3
Agonum assimile (0; 1) - 3

Hydrophilidae

Megasternum boletophagum Marsh. (0; 1) - 3

Silphidae

Nargus anisotomoides Spence (0; 1) - 3
— *velox* Spence (1; 0) - 2
Choleva agilis Ill. (1; 0) - 1
— *elongata* Payk. (1; 0) - 1
— *jeanneli* Britten (5; 10) - 1
— *oblonga* Latr. (0; 1) - 1
Catops nigricans Spence (0; 1) - 1
— *westi* Krog. (1; 0) - 2
Sciodrepoides watsoni Spence (0; 1) - 2
Colon latum Kr. (9; 6) - 3

Liodidae

Liodes calcarata Er. (1; 0) - 3
Agathidium atrum Payk. (2; 0) - 3

Ptiliidae

Ptenidium myrmecophilum Allib. (3; 3) - 3
Acrotrichis atomaria Deg. (5; 8) - 3
— *intermedia* Gillm. (4; 7) - 3

Staphylinidae

Micropeplus porcatus F. (0; 1) - 3
Lathrimaeum atrocephalum Gyll. (1; 1) - 2
Coprophilus striatulus F. (0; 3) - 3
Oxytelus mutator Lohse (0; 1) - 3
— *rugosus* F. (18; 4) - 2
— *tetracarinatus* Block (0; 2) - 3
Lathrobium fulvipenne Grav. (1; 0) - 3
Othius myrmecophilus Kies. (0; 1) - 2
Philonthus decorus Grav. (18; 0) - 2
Quedius fuliginosus Grav. (1; 0) - 3
— *longicornis* Kr. (0; 3) - 1
Tachinus laticollis Grav. (21; 3) - 2
— *rufipes* Deg. (15; 1) - 2
Sipalia circellaris Grav. (0; 1) - 3
Atheta angusticollis Thoms (0; 1) - 3
— *graminicola* Grav. (0; 1) - 3
— *hepatica* Er. (2; 0) - 2
— *pygmaea* Grav. (0; 1) - 3
— *sodalis* E. (3; 0) - 2
Ilyobates subopacus Palm (0; 1) - 2
Oxypoda umbrata Gyll. (0; 1) - 3
Aleochara spadicea Er. (11; 7) - 1

Pselaphidae

Bythinus burrelli Denny (2; 0) - 3

Histeridae

Hister marginatus Er. (0; 1) - 1

Nitidulidae

Meligethes aeneus F. (0; 1) - 3

Rhizophagidae

Rhizophagus cribratus Gyll. (3; 1) - 3
— *perforatus* Er. (1; 0) - 3

Cryptophagidae

Cryptophagus setulosus Sturm (1; 0) - 3

Colydiidae

Cerylon fagi Bris. (1; 1) - 3

Curculionidae

Barypithes pellucidus Boh. (6; 2) - 3
Tropiphorus carinatus Müll. (1; 0) - 3

Discussion

From a coenological point of view the listed species may be divided into three groups.

Group 1 consists of eucoenic species, evidently strongly adapted to life in the subterranean galleries of small mammals and only exceptionally found

outside those. To this group are referred: the *Choleva*-species, *Catops nigricans, Quedius longicornis,* and *Hister marginatus,* 8 species in all.

According to the results of several sampling series in Skåne (Israelson 1959, 1960, 1963) *Hister marginatus* is rarely found in the run-ways but often in the very nests (Israelson 1962), *Quedius longicornis* and *Aleochara spadicea* often both in run-ways and nests. The *Choleva*-species seem to be practically restricted to the run-ways since they were very common there but extremely rare in the nests. *Catops nigricans* was never found in the nests, only in run-ways but not in those of open fields.

Group 2 comprises the following species often met with in the galleries, sometimes in relatively high frequencies, but more commonly in overground biotopes: *Trechus micros, Patrobus atrorufus, Pterostichus melanarius, P. niger, Nargus velox, Catops westi, Sciodrepoides watsoni, Lathrimaeum atrocephalum, Oxytelus rugosus, Othius myrmecophilus, Philonthus decorus, Tachinus laticollis, T. rufipes, Sipalia circellaris, Atheta hepatica, A. sodalis,* and *Ilyobates subopacus,* 16 species in total.

Group 3 is formed by the remaining 37 species which are regarded as occasional visitors in the galleries. In some cases this is quite obvious, for instance for the phytophagous *Meligethes aeneus, Barypithes pellucidus,* and *Tropiphorus carinatus* or the species living in decaying stumps (*Colon latum, Agathidium atrum, Bythinus burrelli,* the *Rhizophagus*-species, and *Cerylon fagi*).

This grouping is a provisional one. Mainly it is based on the experiences from my previous investigations in this field rather than on knowledge of the life-history of the individual species. The limits are not very sharp and in not a few cases the position of the species in the classification system can be discussed. Possibly *Trechus micros* and *Atheta hepatica* would fit better in group 1, for instance.

To some extent groups 2 and 3 will correspond to the classification into tychocoenic and xenocoenic species. But mostly it is not possible at present to say for certain which of the species may be tychocoenic in the sense that they are able to perform their life-cycle in the tunnel systems.

It may be of some interest to compare the results of the Nivå series with those obtained from a sampling series in a somewhat similar, though dryer, biotope at Lommarp in Skåne (Israelson 1960). The latter series covered 15 months in unbroken succession.

From July 16 to August 16, 13 species and 61 examples were trapped meaning an average capture of 0.19 individuals per trap and day. In the Nivå series the corresponding figure was 1.18.

If group 1 is considered alone, the Lommarp series gave 0.04 and the Nivå series 0.20 examples per trap and day.

Seemingly the latter locality was considerably richer in species and individuals than was Lommarp one. However, in some special Skåne series where several traps were dug down closely to one another along the same tunnel it appeared that a varying number of examples pass the traps without being trapped. It was also found that, within certain limits, the number of trapped insects is roughly proportional to the diameter of the trap's openings.

In the traps used in Lommarp the diameter was only 11 mm while in those selected for the Nivå series it was 7 times greater. This will explain most of the differences as to the number of examples captured.

From the above list it appears that the number of species obtained in the July and the August period was about the same, 36 and 38 respectively. Some species like *Pterostichus melanarius, Oxytelus rugosus, Philonthus decorus* and the *Tachinus*-species were trapped in much higher frequencies in July than in August.

In Lommarp the tunnel fauna was very close to its annual minimum in the last half of July and the first half of August both regarding species and individuals, particularly in respect of group 1. For the latter the number of examples captured was often at least 30 times as great in midwinter and June as in August.

There is reason to believe, therefore, that if the sampling at Nivå should be repeated in late autumn and winter or in early summer, the eucoenic element would prove to possess a much stronger representation than in the present material.

Abstract

The coleopterous summer fauna of the subterranean run-ways of moles (*Talpa europaea* L.) in a Danish forest was explored by means of pit-falls. The methods are described and the results are given and discussed.

References

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