New records of Carabidae (Coleoptera) from coastal North Trøndelag, Central Norway

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During a pitfall trapping study in a coastal area of Central Norway (2002, 2003), three new species of ground beetles (Coleoptera, Carabidae) were recorded in North Trøndelag County: *Notiophilus palustris* (Duftschmid, 1812), *Cymindis vaporariorum* (L., 1758) and *Amara aenea* (Degeer, 1774). In addition, 14 species were recorded new to the coastal parts of the county, where the total number of carabids known to occur stands at 46. There are 111 recorded carabid species in North Trøndelag. The distributions of the species recorded new for North Trøndelag are discussed in the context of spreading abilities.

Keywords: Carabidae, biogeography, faunistics, Central Norway

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INTRODUCTION

The knowledge of the distribution of the ground beetle fauna in Norway is far from complete (Ødegaard & Ligaard 2000), despite the popularity of this group among entomologists and the numerous papers on the matter (Andersen 1962, Lindroth 1985, 1986, Vik 1991, Tømmerås & Breistein 1995). Especially areas far from cities represent large gaps in the knowledge of entomofauna. In general, the entomofauna of Norway is far from being well known (Skartveit et al. 2004, Thunes et al. 2004).

The results presented here is a conspectus of the new recordings of ground beetles (Coleoptera, Carabidae) in North Trøndelag, revealed during a study of diversity, habitat preferences and species assemblages of ground beetles (Hatteland 2004, Hatteland et al. in press). Two distinct sampling seasons took place during the summer seasons of 2002 and 2003.

MATERIAL AND METHODS

This study was carried out in the Nærøy municipality (6 May-11 September 2002) and Namsos municipality (23 May-17 July 2003), North Trøndelag county, Central Norway (65.75°N, 11.5°E). In the main study area in Kjeksvika (0-63 meters above sea level) close to Abelvær in Nærøy municipality, altogether 26 sampling sites were established (Table 1). Botanical surveys and vegetation descriptions of Kjeksvika have been given by Nilsen (1998). Heathland is the dominant vegetation type in Kjeksvika, making the area a subject for conservation and management. Eight additional sites were chosen outside the Kjeksvika area. These were located along the road from Abelvær to Skaga in Nærøy municipality, and consisted of different types of forest (Table 1). Furthermore, two sites were chosen in Namsos municipality as well as two sites in Fosnes municipality. The sites in Namsos and one of the sites in Fosnes were all situated in open coniferous forests dominated by bilberries (Table 1). One of the sites in Fosnes was situated in a dense spruce forest. The sites have been given codes according to "the Strand system", which divides Norway into geographical regions.

A trapping line was established in each site, consisting of eight pitfall traps, at 1-2 m intervals. The traps were plastic cups with an upper diameter of 6.5 cm and 9.5 cm deep, half filled with formaldehyde (4%). A metal roof (11x11 cm) was placed approximately 3-4 cm above each trap.

The species were identified according to Lindroth (1961, 1985, and 1986) and checked with specimens in the Andreas Strand beetle collection at Bergen Museum. The material was deposited at the Bergen Museum.

Table 1 List of the vegetation types and transition zones (transition between two vegetation types) and their respective number of sites, species, singletons and doubletons, rare species, and common species.

Habitat type	No. of sites	Mean no. of species and doubletons	Mean no. of singletons	Mean no. of rare species	Mean no. of common species
Dike	1	2	2	0	0
Meadow	3	7	3	7	1
Wet heathland	3	7	3.3	2	1.7
Dry heathland	1	7	2	1.7	2.5
Dry grass-herb rich heathland	2	6	1	5	0
Bird fertilized coastal vegetation	2	8	4	2	2
Scrubland	3	5.7	2	2.3	1.3
Bog	2	9	4	3.5	1.5
Birch forest	3	5.7	2.3	3	0.3
Open coniferous forest	6	7.3	2.7	2.5	2
Other deciduous forest	2	9.5	4	2	3.5
Dense spruce forest	2	2.5	2	0.5	2
Planted spruce stand	1	5	2	1	0
Dike-meadow	1	8	4	3	1
Dry heath-wet heath	1	8	3	4	1
Dry heath-birch forest	1	10	3	7	0
Meadow-birch forest	1	11	6	3	2
Meadow-dry grass and herb rich heath	1	9	3	5	1
Dry grass and herb rich heath-birch forest	1	2	1	0	1
Bog-birch forest	1	11	5	4	2

RESULTS

A total of 2275 specimens were identified, representing 36 species of Carabidae. Of these, five species (13.9%) were singletons and two species (5.6%) were doubletons, while 19 species (52.8%) were represented by ten or more individuals. Of these, three carabid species are listed as new to the county and 14 species as new to the coastal areas of the county.

Species new to coastal North Trøndelag

Tribe Carabini

***Carabus coriaceus* (L., 1758)**
Coastal parts of North Trøndelag (NTY) Nærøy: Torland, Skaga and Valan (EIS 106), 6 May-11 September 2002. In total, 37 specimens were found. The species was abundant in bilberry forest and scrubland. Known to the coastal parts of the county of Nordland (Lindroth 1985), although not recorded in either the inner parts of Nordland or the coastal parts of North Trøndelag according to Vik (1991).

Tribe Cychrini

***Cychrus caraboides* (L., 1758)**
NTY Nærøy: Kjeksvika, Torland, Skaga and Valan (EIS 106), 6 May-11 September 2002. The fifth most common species represented by 120 specimens. It appeared abundant in heathlands and bird-fertilized coastal vegetation. **NTY** Namsos (EIS 101 and EIS 106), 23 May-17 July 2003. In total, four specimens were found, of which three were caught in bilberry forest and one in heather-bog bilberry forest. The species is distributed and common in most parts of Denmark and Fennoscandia (Lindroth 1985), although not previously recorded in the coastal parts of North Trøndelag (Vik 1991).

Tribe Nebriini

***Leistus terminatus* (Panzer, 1793)**
NTY Nærøy: Kjeksvika, Torland, Skaga and Valan (EIS 106), 6 May-11 September 2002. The species seems common for the area investigated, appearing 62 times in the dataset. The species was especially common in deciduous forest, although

it appeared in almost all vegetation types studied; heathlands, meadows, bird-fertilized coastal vegetation, bilberry forests and scrublands. **NTY** Namsos (EIS 101 and EIS 106), 23 May-17 July 2003. Only two specimens were found in Namsos, one in each EIS-grid. Both sites are in bilberry forest. The species is common in most of Norway to the Polar Circle (Lindroth 1985), although not previously recorded in the coastal parts of North Trøndelag (Vik 1991).

Tribe Notiophilini

***Notiophilus germinyi* Fauvel, 1863**
NTY Nærøy: Kjeksvika (EIS 106), 6 May-11 September 2002. In total, eight specimens were trapped, mostly in the transition zone between meadow and dry heathland. Also present in dense spruce forest, dry heathland and the transition zone from dry heathland to birch forest. The species is common in most parts of Norway, but not found in the coastal parts of North Trøndelag (Lindroth 1985, Vik 1991).

***Notiophilus palustris* (Duftschmid, 1812)**
NTY Nærøy: Valan (EIS 106), 6 May-11 September 2002. Six specimens were collected in an open coniferous forest. The species has been found along the southern coast to Sogn (Lindroth 1985) and also in Møre & Romsdal (Vik 1991). It has been presumed present in North Trøndelag by Tømmerås & Breistein (1995). The species is hygrophilous, occurring in shady localities such as deciduous woodland and meadows with tall and dense vegetation (Lindroth 1985).

Tribe Elaphrini

***Elaphrus riparius* (L., 1758)**
NTY Nærøy: Torland (EIS 106), 16 June-11 September 2002 and Skaga (EIS 106), 6 May-15 June 2002. One specimen each from the mentioned localities. Found in birch forest and other deciduous forests. Distributed in most of Norway, but absent from some western coastal areas (Lindroth 1986, Vik 1991).

Tribe Patrobini

***Patrobus atrorufus* (Ström, 1868)**
NTY Nærøy: Skaga (EIS 106), 6 May-11 September 2002. The species was represented by 244 specimens, all of which were caught in deciduous forest. One in dense spruce forest. The species seems therefore very restricted to deciduous forest, which is in accordance with Lindroth (1985). **NTY** Namsos (EIS 101), 23 May-17 July 2003. Three specimens caught in bilberry forest. *P. atrorufus* is generally distributed north to northern Nordland (Lindroth 1985, Vik 1991), except the coastal parts of North Trøndelag (Vik 1991).

Tribe Bembidiini

***Bembidion lunatum* (Duftschmid, 1812)**
NTY Nærøy: Valan (EIS 106), 16 June-11 September 2002. A single specimen caught in bilberry forest. The species is new for the county according to Vik (1991), although it has been recorded by Lindroth (1985). The species is scattered in the southeastern and central districts of Norway, in addition to a few local records from Northern Norway.

Tribe Pterostichini

***Pterostichus diligens* (Paykull, 1790)**
NTY Nærøy: Kjeksvika, Valan (EIS 106), 6 May-11 September 2002. Altogether, 23 specimens were trapped. The species was abundant in bilberry forest. It is very common over the entire Fennoscandia and Denmark (Lindroth 1986), not previously found in the coastal parts of North Trøndelag (Vik 1991).

***Pterostichus strenuus* (Panzer, 1797)**
NTY Nærøy: Kjeksvika (EIS 106), 6 May-11 September 2002. The species was rare, occurring five times in the data set. Present in the scrubland and the transition zone from meadow to birch forest. It has been found north to Troms (Lindroth 1986, Vik 1991), except the coastal parts of North Trøndelag (Vik 1991).

***Agonum piceum* (L., 1758)**
NTY Nærøy: Kjeksvika (EIS 106), 16 June-11 September 2002. Only three specimens were caught in the transition zone from bog to birch forest. The species is most common in coastal areas from Østfold to the inner parts of Hordaland and also in South Trøndelag as well as the inner parts of North Trøndelag (Lindroth 1986, Vik 1991).

Tribe Amarini

***Amara aenea* (Degeer, 1774)**
NTY Nærøy: Kjeksvika (EIS 106), 6 May-11 September 2002. Altogether twelve individuals were trapped, mostly in meadow, but also in heathland, bird-fertilized coastal vegetation, the transition zone between meadow and perennial grass/herb and seaweed-influenced dike. It has previously only been found south of Trøndelag (Lindroth 1986, Vik 1991). The species is rather common in the south and southeast, especially along the coast (Lindroth 1986). *A. aenea* is a xerophilous species common in open country, especially in meadows with rich vegetation (Lindroth 1986).

***Amara lunicollis* (Schiødte, 1837)**
NTY Nærøy: Kjeksvika (EIS 106), 6 May-11 September 2002. A total of eight specimens were found, all in meadows except

two specimens, which were trapped in the transition zone from meadow to dry heathland. It is a common species, scattered throughout Norway (Lindroth 1986), although the species has not been recorded in the outer parts of North Trøndelag (Vik 1991).

***Amara communis* (Panzer, 1797)**
NTY Nærøy: Kjeksvika (EIS 106), 6 May-11 September 2002. The species occurred nine times in meadows, perennial grass/herb and seaweed-influenced dike, the transition zone between meadow and dike, and between meadow and birch forest. *A. communis* is distributed in all parts of Norway, except Finnmark (Lindroth 1986, Vik 1991). Still, the species has not been found in the outer parts of North Trøndelag (Vik 1991).

***Amara plebeja* (Gyllenhal, 1810)**
NTY Nærøy: Torland (EIS 106), 6 May-15 June 2002. Two individuals found in birch forest. The species has been found north to the southern parts of Nordland (Lindroth 1986, Vik 1991), although not in the coastal parts of North Trøndelag (Vik 1991).

Tribe Harpalini

***Trichocellus placidus* (Gyllenhal, 1827)**
NTY Nærøy: Kjeksvika (EIS 106), 6 May-15 June 2002. Only one specimen was trapped in the transition zone from meadow to birch forest. *T. placidus* is common in most areas north to 70°N (Lindroth 1986), although not recorded in the coastal parts of North Trøndelag (Vik 1991).

Tribe Lebiini

***Cymindis vaporariorum* (L., 1758)**
NTY Nærøy: Kjeksvika (EIS 106), 6 May-15 June 2002. A single specimen was trapped in wet heathland. The species is known from all provinces of Norway, except for West Agder, Vestfold and North Trøndelag (Lindroth 1986, Vik 1991, Tømmerås & Breistein 1995), as well as from alpine areas in the arctic mainland of Norway (Olsvik et al. 2001). It is believed to be a more or less stenotopic species occurring on *Calluna*-dominated heathland (Lindroth 1986).

DISCUSSION

The total number of ground beetle species recorded in North Trøndelag, previously 108 (Vik 1991), now stands at 111. The total number is probably much higher, undetected due to the low sampling effort in North Trøndelag and a patchy distribution of many species (Ødegaard & Ligaard 2000). All the three species new to the county are capable of flying. *N. palustris* and *C. vaporariorum*, are dimorphic, having specimens with developed hind wings as well as individuals with reduced hind wings. The former species was represented by six specimens, of which three specimens were macropterous (with well-developed hind wings) and three individuals were brachypterous (with reduced hind wings). *C. vaporariorum* was only represented by one specimen, which was brachypterous. These records are at the edge of or perhaps outside their distribution areas, possibly carried by wind in the case of the macropterous specimens. On the other hand, the brachypterous specimens testify that the species must have persisted in the respective sites for more than one generation.

A. aenea is a macropterous species, indicating that the species possesses high dispersal power. It is perhaps expanding northwards, because of climate changes (Olberg & Andersen 2003). Such expansion may only be temporarily until the climate worsens (Ødegaard & Ligaard 2000).

Some of the species recorded, although new to the coastal areas of North Trøndelag, are most likely common species for this area. *C. caraboides*, *L. terminatus*, *P. atrorufus*, *C. coriaceus* and *P. diligens* represented by 124, 64, 247, 37 and 23 specimens, probably all belong to this group. This testifies how unexplored some areas are with respect to the entomofauna. It is also possible that some of the other species recorded new for the investigated area are common species for this area. The genera *Amara* and *Notiophilus* are small species, underestimated by pitfall trapping (Spence & Niemelä 1994, Mommertz et al. 1996). *A. communis*, *A. lunicollis* and *N. germinyi* may be common in this area, occurring nine, eight and eight times, respectively. The rest of the species were only represented by ≤ five specimens and seem to be rare for the examined area, possibly outside or at the edge of their distribution areas.

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SAMMENDRAG

Nye funn av Carabidae (Coleoptera) fra ytre deler av Nord-Trøndelag, Midt-Norge

En fallfelleundersøkelse langs kysten av Midt-Norge (2002, 2003), resulterte i tre nye løpebiller for Nord-Trøndelag: *Notiophilus palustris* (Duftschmid, 1812), *Cymindis vaporariorum* (L., 1758) og *Amara aenea* (Degeer, 1774). I tillegg ble det funnet 14 nye arter for den ytre delen av Nord-Trøndelag, slik at tallet på løpebiller er nå 46. En del av disse er mest sannsynlig

vanlige arter for området, noe som understreker hvor dårlig det aktuelle området er undersøkt. Det totale antall registrerte løpebiller i Nord-Trøndelag er 111 arter. Utbredelsen av artene som er registrert som nye i denne undersøkelsen blir diskutert i henhold til spredningsegenskaper og klima-forandringer.

REFERENCES

Andersen, J. 1962. Billefunn fra forskjellige deler av Norge, spesielt fra indre Sør-Trøndelag (Coleoptera). (Findings of beetles from different parts of Norway, with emphasis on inner parts of South Trøndelag (Coleoptera)) - Norsk Ent. Tidsskr. 12: 49-54.

Hatteland, B. A. 2004. Diversity, habitat preferences and species assemblages of ground beetles (Coleoptera, Carabidae) in a coastal area of North Trøndelag, Central Norway. - Cand.scient. Thesis. University of Bergen.

Lindroth, C. H. 1961. Beetles. Coleoptera, Tiger beetles and ground beetles. Fam.Carabidae. (2nd ed.) (In Swedish). - Svensk Insektfauna 9: 1-209.

Lindroth, C. H. 1985. The Carabidae (Coleoptera) of Fennoscandia and Denmark 1. - Faun. Ent. Scand. 15: 1-225.

Lindroth, C. H. 1986. The Carabidae (Coleoptera) of Fennoscandia and Denmark 2. - Faun. Ent. Scand. 15: 226-497.

Mommertz, S., Schauer, C., Kösters, N., Lang, A. & Filser, J. 1996. A comparison of d-vac suction, fenced and unfenced pitfall trap sampling of epigeal arthropods in agro-ecosystems. - Ann. Zool. Fennici 33: 117-124.

Nilsen, L. S. 1998. Outline of a management plan for the Kjeksvika area in Nærøy, North Trøndelag. - Rapport botanisk serie 5. Norwegian Institute for Nature Research, Trondheim. (In Norwegian with English summary)

Olberg, S. & Andersen, J. 2003. Contribution to the knowledge of Norwegian Coleoptera. - Norw. J. Entomol. 50: 131-136.

Olsvik, P. A., Ødegaard, F. & Hanssen, O. 2001. The beetle fauna (Coleoptera) of the arctic mainland of Norway. - Fauna norv. 21: 17-24.

Skartveit, J., Pommeresche, R. & Solhøy, T. 2004 Notes on uncommon beetles (Coleoptera) collected during a survey in Hardanger, western Norway. - Norw. J. Entomol. 51: 151-158.

Spence, J. R. & Niemelä, J. K. 1994. Sampling carabid assemblages with pitfall traps: The madness and the method. - Can. Ent. 126: 881-894.

Thunes, K. H., Skartveit, J., Gjerde, I., Starý, J., Solhøy, T., Fjellberg, A., Kobro, S., Nakahara, S., zur Strassen, R., Vierbergen, G., Szadziewski, R., Hagan, D. V., Grogan Jr., W. L., Jonassen, T., Aakra, K., Anonby, J., Greve, L., Aukema, B., Heller, K., Michelsen, V., Haenni, J.-P., Emeljanov, A. F., Douwes, P., Berggren, K., Franzen, J., Disney, R. H. L., Prescher, S., Johanson, K. A., Mamaev, B., Podenas, S., Andersen, S., Gaimari, S. D., Nartshuk, E., Sørli, G. E. E., Papp, L., Midtgaard, F., Andersen, A., von Tschirnhaus, M., Bächli, G., Olsen, K. M., Olsvik, H., Földvári, M., Raastad, J. E., Hansen, L. O. & Djursvoll, P. 2004. The arthropod community of Scots pine (*Pinus sylvestris* L.) canopies in Norway. - Entomol. Fennica 15: 65-90.

Tømmerås, B. Å. & Breistein, J. 1995. Fragmenteringsforsøk i granskog: Problemstillinger og metoder samt resultater fra feltsesongen 1994. (Fragmentation experiments in spruce forest: Issues and methods as well as results from the field season of 1994) - NINA oppdragsmelding 342. Norwegian Institute for Nature Research, Trondheim. (In Norwegian)

Vik, A. 1991. Catalogus Coleopterum Norvegica. - Stig Otto Hansen, Larvik. 157 pp.

Ødegaard, F. & Ligaard, S. 2000. Contribution to the knowledge of Norwegian Coleoptera. - Norw. J. Entomol. 47: 7-19.