

On the biology of *Andrena ferox* Smith (Hymenoptera, Aculeata: Andrenidae)

by

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ABSTRACT. — A colony of *Andrena ferox* Smith, 1847, consisting of at least ten nests, was discovered near Nijmegen in May 1975. Each nest was inhabited by up to 80 females. No flower visits could be observed, but subsequent identification of pollen samples, taken from several bees, showed that the insects had exclusively foraged on *Quercus*.

During a field meeting of the Insect Study Group of the Netherlands Youth Association for Nature Study (I.W.G., N.J.N.) an *Andrena*-nest was found in the environments of Nijmegen in May 1975. The nest was very peculiar, because it was not occupied by a single female, as is usual in *Andrena*. Females were landing unceasingly in the neighbourhood of the nest at the time of its discovery, approx. 19 h. Two days later the nest was studied again, at approx. 10 h.; the weather was not so fine: overclouded and the temperature was about 16°C. It was found to be one of a colony of at least eleven nests, all close together. The *Andrena*-females were leaving the holes, one behind the other; but presumably because of being benumbed by the comparatively low temperature, they stayed together; some crept on blades of grass. After about an hour the weather gradually changed, the clouds dissolved and the temperature rose. At that moment, the bees started to fly away. Moreover, a continuous flow of insects was still leaving the entrances. More than half an hour after most of the bees had left the colony, the first females returned, burdened with pollen, and reentered the nests. Only three females were still lingering in the entrance area at that time.

To get an impression of the number of bees in the nest first found we counted the number of bees going in and out until 13 h.; after that time the number of in- and out-going bees was about the same. The results were surprising: up to 80 females were found to occupy the nest. We have not seen any males, which is not surprising since *Andrena*-males usually fly a little earlier in the season than the females. (This is in accordance with the data on the flying time of *A. ferox* given in the literature.)

One nest (presumably a small one, since only a few females had been seen leaving it) was dug out to get an impression of its architecture. It was found to consist of one vertical shaft with side-passages radiating from it in all directions; each of the side-passages ended in a pollen-chamber. The main shaft went down to about 30 cm, after which it split into two shafts which seemingly were not finished yet. The exact course of the side-passages was difficult to establish, since once the pollen-chamber was filled, the passages were filled with soil. In some cells little larvae were found, and twice during the excavation we noticed an adult parasite, viz *Nomada hillana* Kirby; we cannot, however, tell for certain that they had been surprised within the nest.

We had some trouble with the identification of the bee. It appeared finally to be *Andrena ferox* Smith, 1847, a species which is known to inhabit colonies with a common entrance. The same is known of the closely related *A. bucephala* Stephens (Yarrow & Guichard, 1941).

Concerning the plant species visited by *A. ferox*, Perkins (1919) mentioned yellow Composite flowers, while Schmiedeknecht (1930:1916), Stoeckert (1933) and Kocourek (1966) state that the bee visits *Crataegus*.

According to the three last-mentioned authors *A. ferox* is parasitized by *Nomada mutica* Morawitz, which also visits *Crataegus*; *N. mutica*, however, neither occurs in Britain nor in the Netherlands. In Britain *N. marshamella* Kirby has been seen at a colony of *A. ferox*, but it was not sure that parasitism actually occurred, since *Andrena sabulosa* (Scopoli), the normal host of this *Nomada*, was nesting on the same bank (Yarrow & Guichard, 1941).

Judging after the faunistical literature, *A. ferox* has been found in a great part of Europe, but it seems to be rare throughout its range. Stoeckert (1933) mentions only six localities in

Germany, and two where *N. mutica* has been found. He specified the range of distribution of *A. ferox* as follows: "from N. Italy and S. and N. Germany to France and Britain (According to Schmiedeknecht, 1882: Paris; according to Magnetti in Lombardy.)". Aerts, 1949, mentions two other localities in Germany. From France five observations are known after 1950 and one from Belgium (Warncke & al., 1974). Yarrow & Guichard (1941) give some four localities in Britain, Ceballos (1956) mentions the species from Spain. Further, De Beaumont (1969: 351) gives one locality in Switzerland, Warncke (1966, 1967) mentions respectively Bosnia and Crimea; Kocourek (1966) mentions ten localities in the C.S.S.R., Moczar & Warncke (1972) give about five localities in the Carpatian Basin and finally Wiering (1970) mentions one locality in the Netherlands.

On two days in the next year we tried to study some biological details of this interesting bee. At the first occasion (8.V.1976) we were present at the colony at about 9 h. The weather was fine: almost cloudless and warm for the time of the year. The *Andrena*'s were very active and flew around in large numbers. The *Crataegus* in the environments of the colony were not yet in flower, but nevertheless we witnessed females loaded with pollen entering the nests. Yellow flowered Composites were abundant (*Taraxacum*, *Hieracium* and *Crepis*) everywhere in the neighbourhood, but never could we observe a visit to any of these; actually, we have not observed flower-visiting by *A. ferox*.

At our next visit (16.V.1976) *Crataegus* was in flower, even very close to the colony. Yet we again were not able to observe any flower visit; at one occasion we saw a female on a *Crataegus* blossom, but the bee carried no pollen. Since it appeared from a scrutiny of other *Andrena*-species foraging on *Crataegus* that the colour of the pollen of *Crataegus* was different from what we found on *A. ferox*. We took pollen samples from the hind legs of some of the returning bees. Identification of the pollen showed that the insects had exclusively visited *Quercus*.

Quite recently, a comparable observation from some American *Andrena* species was published by Bottema (1975) who cited a communication by Michener "There are many bees that regularly collect and use windblown pollen, . . . Bees of the genus *Andrena* frequently collect from *Quercus* . . ." Bottema, l.c., moreover cites a communication by G. E. Bohart, of an *Anthophora* species in Utah collecting pollen exclusively from *Quercus*. Finally, Bottema (l.c.: 24) mentions a pollen sample from an *Osmia* nest sampled on 18.IX.1974 from a wall of an old farmhouse at Ide (Drente, the Netherlands), which contained besides 61% Compositae-pollen (*Matricaria*-type) also contained 37,5% *Quercus* pollen.

Whereas *Quercus* is not included in the long lists of plants visited by bees (Friese, 1923), it is known that in the C.S.S.R. *A. ferox* nests only at the edge of oak woods. The males usually fly around the oaks standing in the border of the wood, where they copulate on the leaves, often at a height of 4-5 meters (Kocourek, 1966).

We saw parasites at several occasions. *Nomada marshamella* and *Nomada hillana* flew around the nests, but we never saw a parasite entering a nest entrance. Sometimes we witnessed a Tachinid fly (probably *Miltogramma*, *Metiopa* or related genus) waiting on a grass blade until an *Andrena* entered a hole. The bee was followed very closely then, and an instant later the bee as well as the tachinid disappeared into the nest.

Next spring we hope to start a thorough research into the flower visiting biology, and nesting biology, of this remarkable species. The author would sincerely appreciate to receive information concerning plants visited, breeding habits and parasitism of *A. ferox* in other locations.

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VLINDERS EN SNELVERKEER. — Na een aantal jaren zonder Schouwse waarneming van de Grote Vos, *Nymphalis polychloros* (Linnaeus), was het verheugend op 1 augustus 1977 weer eens een vlinder van deze soort te Burgh aan te treffen. In mijn notities moet ik tot 1964 teruggaan om waarnemingen van deze vlinder te vinden. Ik zag toen op 14 mei een afgevlagen exemplaar, eveneens te Burgh.

Een gaaf, maar helaas dood exemplaar vond ik op 27 juni 1964, tezamen met een eveneens dode *Thymelicus lineola* (Ochsenheimer), op de radiator van een te Haamstede geparkeerde Duitse auto. Bij navraag bleek de auto die dag uit Stuttgart te zijn gekomen (via België). Waarschijnlijk werd de *polychloros* dus buiten ons land door de auto geschept.

Wie bij het snelverkeer betrokken is ziet nog al eens vlinders op deze wijze de dood vinden, ook al worden de voorgeschreven snelheden in acht genomen. Vooral als het zeldzame soorten zijn is dit te betreuren.

Zo meldde een automonteur (tevens natuurliehebber!) uit Zierikzee me een paar jaar geleden, dat hij onder de motorkap van een ter reparatie aangeboden auto de resten aantrof van een Koninginnepage, *Papilio machaon* (Linnaeus).

En nog onlangs (9 september 1977) toonde Drs. J. P. Vaane te Haamstede me een dood Dambordje, *Melanargia galathea* (Linnaeus), dat hij van een uit Frankrijk bij hem aangekomen auto had losgemaakt.

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