THE WASPS AND BEES (HYMENOPTERA: ACULEATA) OF POMPOCALI, NEAR LEEDS: THE FIRST 27 VISITS

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Pompocali is a 1.7 ha. (4.2 acres) site (GR SE 3742) lying to the east of Leeds between the villages of Thorner and East Rigton and abutting on the south border of Hetchell Wood Nature Reserve.

Pompocali lies on the East Carlton Grit, a sub-division of the Millstone Grit, and was used as a quarry until the 17th or possibly the 18th century, when it became covered by oak trees, felled in the 1930s (Henderson 1979). At present, Pompocali consists of a central mound surrounded by a depression and a series of outer mounds. The tops of the mounds bear *Calluna* heath and the slopes, which are often steep, have bare patches so that the dry freely-draining sandy soil is visible. A network of paths has also resulted in bare areas of soil. Old tree stumps are scattered all over the site. The site is basically an open one, although some hawthorn and bramble have invaded in a few places.

The mounds have proved particularly attractive to nesting aculeate wasps and bees and after 27 visits 64 species have been found, which represents about a quarter of the Yorkshire list of wasps and bees. The site was visited from 1978 to 1983, with two visits in April, six in May, five in June, eight in July, five in August and one in September so that the active season when adult wasps and bees are on the wing has been covered.

Of the 64 species, 11 were solitary wasps, 41 solitary bees (Table 2), five social wasps (*Dolichovespula norvegica, D. sylvestris, Vespula rufa, V. germanica, V. vulgaris*) and seven social bees (*Bombus lucorum, B. terrestris, B. lapidarius, B. pratorum, B. pascuorum, Psithyrus campestris, Apis mellifera*). On each visit a list was made of all the solitary species that could be found. The social species were only noted from time to time and the sex or caste of each species was recorded. Nomenclature is according to Kloet and Hincks (1978).

TABLE 1

The number of species of solitary wasps and bees recorded per month and new species seen each month at Pompocali, near Leeds

	April	May	June	July	August	September
No. of spp.	5	19	27	31	14	7
No. of new spp.	5	15	11	15	4	2

More species were collected in June and July, although the months with the largest number of previously unrecorded species were May and July (Table 1). The May or spring peak was characterized by the mining bees *Andrena* and their cleptoparasites *Nomada*. In these genera the males generally emerged before the females and *Andrena* species before the *Nomada* species. *Nomada* species first emerged in the second week of May while *Andrena* species were present from the beginning of May and five species were found in April. The July or summer peak was characterized by the appearance of the solitary wasps and the mining bees *Lasioglossum* with their cleptoparasites *Specodes* although some species of these groups appeared in June and two species, *L. fratellum* and *L. rufitarse* were present at the end of May. Fertilized females of *Lasioglossum* and *Sphecodes* appeared first, with the males and a second brood of females appearing in August. The genus *Andrena* with the largest number of species (17) with its cleptoparasite genus *Nomada* (nine species) also had species appearing for the first time in June. The bee *Colletes succinctus*, which requires heather flowers as a food source, appeared during July and its cleptoparasite *Epeolus cruciger* during August.

TABLE 2

The number of days on which each species of solitary wasp and bee was recorded at Pompocali, near Leeds

No. days		No. species
	A — Unusual species	
1	*Myrmosa atra, Crossocerus wesmaeli, Psen equestris, Nysson spinosus, Andrena helvola, A. lapponica, A. tarsata, A. subopaca, Halictus rubicundus, Lasioglossum cupromicans, L. smeathmanellus, Sphecodes ferruginatus, S. hyalinatus, S. monilicornis, Epeolus cruciger.*	15
2	*Psen dahlbomi, Andrena bicolor, A. angustior, A. fuscipes, A. humilis, Lasioglossum leucopum, Nomada lathburiana.*	7
3	*Priocnemis parvula, Arachnospila anceps, Crossocerus tarsatus, Colletes succinctus, Andrena clarkella, A. fucata, A. chrysosceles, A. saundersella, Lasioglossum albipes, Nomada panzeri.*	10
	B — Common species	
4	*Sphecodes gibbus.*	1
5	*Sphecodes fasciatus, Nomada fabriciana, N. ruficornis.*	3
6	*Andrena fulva, A. jacobi, A. nigroaenea, A. haemorrhoa, Nomada marshamella.*	5
7	*Tachysphex pompiliformis, Mellinus arvensis, Andrena wilkella, Nomada flavoguttata, N. rufipes.*	5
8	*Crossocerus quadrimaculatus, Andrena cineraria, Nomada goodeniana.*	3
9	*Lasioglossum fratellum.*	1
10	*Nomada striata.*	1
12	*Lasioglossum rufitarse.*	1

Three times as many females (165) were taken as males (55) of the solitary species, because males are on the wing for a shorter period of time than the females. The process of nest building and food collection or the cleptoparasitic habit of finding a host nest in which to force an entry to lay eggs are entirely female occupations and are more time-consuming than the main occupation of the males, which is to locate females for copulation.

The frequency with which species are recorded can be clearly divided into two groups, the group of 20 common species which were recorded on four to 12 days each and the group of 32 unusual species which were recorded on one to three days each (Table 2). The large group of unusual species (61.5% of the solitary species) is also evident in the calculation that the chances of finding the same species on any two consecutive visiting days was only 27.4%. The chances of finding the same species on any two of three consecutive visiting days increases to 37.9% and on any two of four consecutive days to 45.5%. Thus even at four consecutive days the odds are only nearly even on finding any one particular species on more than one day. These analyses would seem to indicate that further visits to the site should be rewarding in terms of finding previously unrecorded species. The presence of so many unusual species could be a consequence of the small size of the site so that few individuals of a species nest there, or the site might in some way be suitable so as to attract a few individuals of species dispersing from elsewhere.

The species of solitary wasps and bees can be separated into four categories with regard to their feeding habits: (a) the predators or solitary wasps which collect insect prey to store in cells as food for their offspring, e.g. *Tachysphex pompiliformis* hunts acridid

grasshoppers, *Crossocerus quadrimaculatus* hunts mainly small diptera, *Mellinus arvensis* hunts larger diptera, mainly Muscidae; (b) the pollen and nectar feeders or solitary bees which collect these resources to store in cells as food for their offspring; (c) the wasp and (d) bee cleptoparasites which use wasps and bees as hosts (Table 3). The solitary wasp species and their cleptoparasites are less numerous than the solitary bee species and their cleptoparasites. The number of cleptoparasitic species are relatively less numerous than their hosts in the common and unusual wasp groups and in the unusual bee group but are equally numerous in the common bee group. These relationships probably exist because the number of individuals per species is smaller in the wasp group compared with the bee group and in the unusual group compared with the common group and thus the respective species are less or more likely to be found. Although data to support this hypothesis was not specifically collected, it can be supported by casual observations. Thus several individuals of a species of *Andrena* bee, a member of the common group, could often be collected in one sweep of the net. These analyses would seem to indicate that if new species are recorded from this site, they are more likely to be further unusual species or solitary wasps.

TABLE 3

The division by feeding habits of the common and unusual groups of solitary wasps and bees at Pompocali, near Leeds

	Common	Unusual	Total
Solitary Wasps:			
Predators	3	6	9
Cleptoparasites	0	2	2
Solitary Bees:			
Pollen & Nectar Feeders	8	18	26
Cleptoparasites	9	6	15

All the solitary wasps and bees nested in the soil except for the wasp *Psen dahlbomi*, which was found nesting in beetle holes in a branch of dead wood lying on the ground. The many old dead tree stumps did not have nesting species. The relative absence of solitary wasps and the total absence of megachilid bees (i.e. leaf-cutting and mason bees) can be largely accounted for by the apparent lack of dead wood which might be suitable as nesting sites.

Most of the species found are common and widespread throughout most of England. However, *Lasioglossum fratellum* is recorded from the north and west of England, *L. rufitarse* from the north of England and west midlands and *L. cupromicans* and *L. smeathmanellum* are a species pair with the former probably mainly present in the north and west of England and the latter in the south and east but there is a large overlap in distribution. Several of the species are local in that they are largely restricted to dry sandy areas and thus are indicators of such habitats: *Tachysphex pompiliformis, Psen equestris, Colletes succinctus* and its cleptoparasites *Epeolus cruciger, Andrena lapponica, A. fuscipes* and its cleptoparasite *Nomada rufipes* and *A. tarsata*. Three species found are rather rare in Yorkshire: *A. helvola* is about the seventh record for Yorkshire, *Psen dahlbomi* the fourth and *A. humilis* the second.

REFERENCES

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