THE OCCURRENCE OF CHTHONIUS ISCHNOCHELES (Hermann) (CHELONETHI: CHTHONIIDAE) IN TWO TYPES OF HAZEL COPPICE LEAF LITTER.

by PHILIP E. JONES.

Introduction. The Order Chelonethi or Pseudoscorpiones contains over 1500 species distributed in three suborders. All three suborders are represented by the 25 British species, none of which measure more than 4 mm. in length. They have become established in a wide range of habitats in this country, the majority living in soil and decaying vegetation, under the bark of trees and under stones. They are carnivorous, feeding on tiny insects and mites smaller than themselves, psocids, springtails and very young spiders.

Chthonius ischnocheles (Hermann) is probably the commonest and most widely distributed of the six species of Chthonius known to occur in the British Isles. It has been recorded from various habitats in this country, including - under stones, amongst dry vegetation, in moss, in oak, beech and hazel leaf litter, and in crevices on the bark of oak trees.

Site and Methods. The material used for the study was collected at various sites in Monks Wood National Nature Reserve, six miles north-east of Huntingdon (Grid Reference: TL52/200800). The Reserve is an ash-oak wood, part of which is under management as coppice with standards. Before 1918, Monks Wood was managed as a mixed coppice of hazel and ash, with mostly oak standards. There has been little silvicultural treatment since 1920 and today most of the woodland consists of trees forty-nine years or less in age, and of coppice origin.

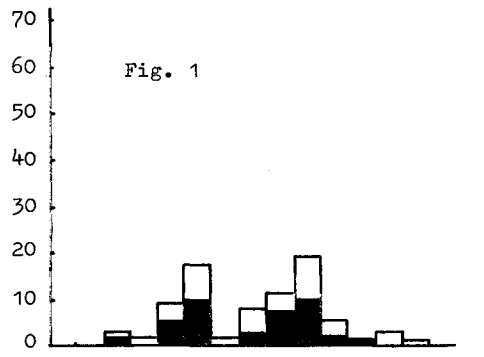
Eight leaf litter samples were collected monthly in wire trays, each of volume approximately 6.7 dm^3 during the period December 1967 to January 1969, with the exception of January 1968 when no samples were collected. Four samples were from the uncut hazel stools and four from the woodland floor. The stool litter was 30-45 cms. in depth and consisted of three layers- fine dark brown humus overlaid with moist leaves and a surface layer of dry leaves. The leaf litter on the forest floor adjacent to the hazel was only a thin layer, consisting of leaves and debris of hawthorn, oak, ash (in a minority) and hazel, together with a certain amount of moss and a small quantity of crumbly earth.

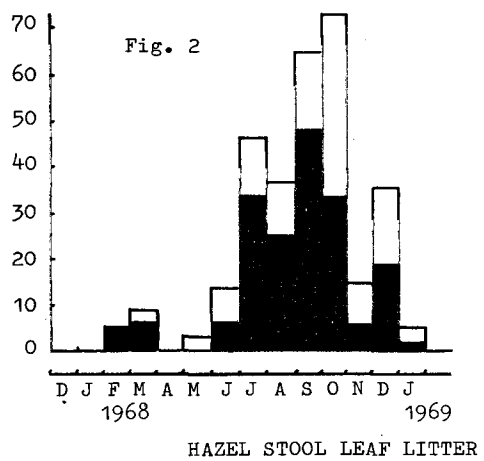
The samples were extracted in a platform extraction apparatus working on a temperature gradient technique (Duffey, 1962). Extraction was considered complete after five days.

Results and Discussion. The total numbers of pseudoscorpions collected each month are shown in figures 1-5. The most noticeable result is the great difference in population densities between deep hazel stool litter and thin ground litter samples. The deeper stool layer also supports a greater diversity of saprophagous invertebrates, including mites and springtails, which according to Gertsch (1949) form a large part of the prey of pseudoscorpions. The ground layer includes a certain amount of crumbly earth and there is less decaying vegetation available for saprophagous invertebrates than in the stool layer.

Adult male and female Chthonius ischnocheles are present in compar-

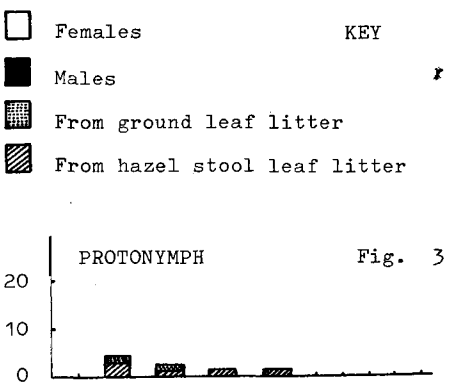
atively high numbers in both litter types throughout the period July to October, with a peak in numbers in September and October. This peak corresponds to that recorded by Gabbutt (1967) from beech litter, except that it occurs later in the year (Gabbutt records peak numbers in July and August). This may be a local phenomenon, due to environmental conditions or temperature. It is difficult to account for the minor peak in adult numbers in February and March in stool samples, and in April and May in ground samples. Possibly the spring and summer peaks in both types represent different generations maturing in spring and late summer; or one generation maturing at different times. It may be assumed that there is an extensive breeding season because of the long period (June to August) over which protonymphs are present. Protonymphs are recorded four or five weeks from the first appearance of the eggs being carried by the female (Kew, 1929), therefore pairing must commence as early as May.

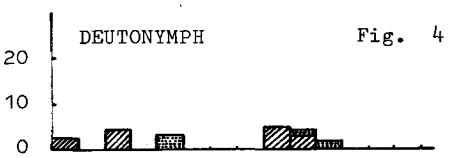


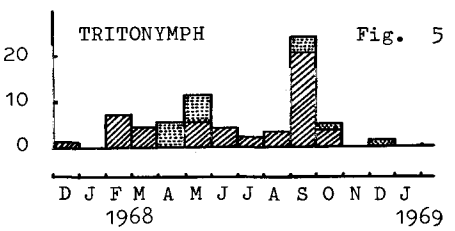


Figs. 1 & 2.

Chthonius ischnocheles Adults.







Figs. 3 to 5.

Chthonius ischnocheles Nymphs.

These diagrams show the total number of animals extracted from hazel stool leaf litter and ground leaf litter from Monks Wood N.N.R. between December 1967 and January 1969. No samples were taken in January 1968.

Most of the adults and nymphs were extracted from hazel stool litter, presumably from a well-established breeding population. The drying out of the shallow ground litter layer in midsummer would seem to render it inhospitable as a breeding place, since numbers of adults were low here and nymphs virtually absent.

The drop in nymphal and adult densities during the winter months may be due to migration from the leaf litter layers into the soil, where they would escape extraction. Traps on oak tree trunks in Monks Wood have revealed a complete absence of this species during the winter months, suggesting that there is no migration up trees. Quite a number of adults were caught in these traps during the months July to September, but no nymphal stages were recorded. The main peaks in the numbers of deutonymphs and tritonymphs appear in August and September respectively, and support the usual estimate of one month for each stage (Kew, 1929).

Conclusions. It is apparent from the above study that the depth of leaf litter influences the number of individuals of all stages present, the greater depth of litter supporting a higher invertebrate population.

Studies on the invertebrates of leaf litter do not usually attempt to analyse the characteristics of this habitat. Viewed in the light of conservation, leaf litter as a habitat should be as diverse as possible and should be allowed to accumulate in cracks and hollows in woodland, both in the tree layer and on the ground, giving depth as well as extent to this habitat. Areas can thus form where high numbers of individuals, not only of pseudoscorpions but other species feeding in leaf litter, can survive and reproduce at times of the year when drying out of shallow and patchy ground litter would threaten them with extinction.

Acknowledgements. I would like to thank Dr.E.Duffey for permission to use material obtained during a wider study of leaf litter invertebrates and for advice on the preparation of this paper, and also Dr.P.D.Gabbutt for initial help in identification of the species and for comments on the results.

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