A FIELD STUDY ON INTERSPECIFIC COMPETITION BETWEEN ANTS (FORMICIDAE) AND HUNTING SPIDERS (LYCOSIDAE, GNAPHOSIDAE, CTENIDAE, PISAURIDAE, CLUBIONIDAE)

by

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I. INTRODUCTION

Much theoretical work has been done on the ecological aspects and evolutionary implications of interspecific competition. This work has often been illustrated by laboratory experiments, but experimental evidence from the field is rather scanty as far as arthropods are concerned.

In the dunes of the Water-supply Company of The Hague, situated between The Hague and Wassenaar, ants and hunting spiders occur in fairly large numbers. Since both are important non-specialized predators of arthropods, they could be competitors. The study reported here was undertaken to test this hypothesis.

II. MATERIAL AND METHODS

In the dune area mentioned above a physiognomically more or less homogeneous meadow was selected in the wooded valley called the Bierlap. A topographical sketch of the study area is given by CRÖN MICHIELSEN (1966: 79). The local vegetation was dominated by Calamagrostis epigejos. In one part of this meadow there were no ants but the other part had large numbers due to a nearby ant hill of Formica rufa. In the tract without ants the vegetation was somewhat lower and greener in the summer; it also appeared to be slightly wetter than the tract with ants.

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In each of these areas ten pitfall traps (jam-jars) were placed 1.5 m apart in a straight line, the two rows running parallel, 65 m apart. As preservation fluid, 4% formalin was used. During the period between 22 May and 21 August, 1968, the traps were emptied once a week. All the animals captured in this way were kept in 70% alcohol. The spiders belonging to the families Lycosidae, Pisauridae, Ctenidae, Gnaphosidae, and Clubionidae were identified and counted. The ants were divided into two groups: *Formica rufa* and other ants. Almost all specimens of the latter group belonged to the Myrmicinae. The spiders and ants accounted for more than 80% of all animals captured.

### III. RESULTS AND DISCUSSION

The total numbers of animals caught over the whole period in the two sets of 10 pitfall traps are given in Table I.

If there were no interaction between spiders and ants, we could expect both the species composition of the spiders and the numbers per species to be the same for the two tracts. But if ants do compete with spiders (both groups being non-specialized predators for the same prey population), we could expect the number of large hunting spiders to be lower in the presence of large numbers of ants as compared to the situation without ants.

From the results shown in Table I we concluded that the spider species composition at the two tracts was not influenced by the presence of ants. The tracts had fourteen spider species in common and the three species found in only one tract were caught in very low numbers (5, 3, and 1). Moreover, the tract in which these three species were found was the one in which ants were numerous. The total number of spiders in the two tracts is almost the same, the difference (41 animals) being only 5% of the total number in each area.

Comparison of the numbers of spiders per species in the two tracts shows that *Aulonia albimana*, *Pardosa nigriceps*, and *Drassodes lapidosus* are appreciably more numerous in the tract in which ants were found, whereas *Pardosa pullata* and *Pardosa monticola* are more numerous in the tract without ants. These differences are due, in our opinion, to the slight difference between the two tracts with respect to the structure of the vegetation and humidity. In our dune area *Pardosa nigriceps* frequents habitats with a high ground cover, whereas *Pardosa monticola* is found in short grass vegetations. The local distribution of *Aulonia albimana* is positively correlated with that of *Pardosa nigriceps*, whereas *Pardosa pullata* only occurs in the wettest places. Notwithstanding these differences, the relative numbers for the spider species caught in the