

NUPTIAL FLIGHTTIME OF ATTA-ANTS IN SURINAM

*Met een samenvatting: Het tijdstip van de bruiloftsvluchten
van de parasolmieren in Suriname*

BY

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Paramaribo

It is a well-known fact that the leafcutting ants (*Attinae*) in Surinam, as in other parts of tropical America, are very disastrous to the cultivations both of the shifting grounds of the inhabitants in the interior, as well as in the plantations of the farmers along the coast. Maniok, coffee, citrus, bananas and many other foodplants are defoliated by them on such a scale, that removals because of these ants are undertaken by the Amerindians and the Bushnegroes in the hinterland and that intensive and expensive controlmeasures have to be taken by the farmers, who are forced to stay on their permanent cultivated areas.

There are two species of ants, which terrorize the country, viz. *Atta sexdens* L. and *Atta cephalotes* L. The former lives on the higher grounds in the interior, damaging the smaller agriculture grounds of the people living in that region. The latter occurs also in the interior but mostly in swampy places; it penetrates, however, the coastal plain too where the larger plantations are laid out.

The biology of the leafcutting ants is a very interesting and a fascinating subject and it has been studied more or less intensively by several students. In Surinam extensive research work on the building of the nests and of the cultivation of the fungus by these ants has been done by STAHEL & GEJSKES (1938-1953).

The control of these insects is largely based on these studies and the experiments with several insecticides have led to a success of the combat. However, there is one important point which seems to have been overlooked. It is the problem of the sexual development and the time of dispersion during the nuptial flights.

Surinam has a tropical climate with a main rainy season (from May-August) and a main dry season (from September-November) while the other time of the year is divided into a small rainy season (December-January) and a small dry season (February-April). So there are two rainy seasons and two dry seasons (see also BRAAK, 1935).

To decide in how far the leafcutting ants are dependent on these monsoons, a study was made of their development during the different months of the year. From one nest of *Atta cephalotes* in the Botanic Garden at Paramaribo and from one of *Atta sexdens* near Lelydorp, about 20 km south of Paramaribo, a sample of one pound (500 g) of fresh fungusgardens (containing about ten gardens) was collected every month. After killing the ants with carbon bisulfide the winged males and females and the sexual larvae and pupae, as far as recognizable in this material, were counted. This experiment started in July 1940 and ended in August 1941. The results are worked out in the two graphic figures added.

The most striking feature in the development of males and females is the limited time of the year. In the nest of *A. cephalotes* this period lasts from the

end of November until June of the next year, while in that of *A. sexdens* sexual individuals are observed from the end of October until April of the next year. From this it appears that there is only a slight difference between the two mentioned species of ants concerning their breeding time. But there is a remarkable contrast in their time of nuptial flight. As the figures show, there is a sudden increase in the number of sexual individuals in the nests, starting for *A. sexdens* at the end of November and culminating in January, for *A. cephalotes* resp. in April and May. This illustrates the time of swarming during which most of the winged ants disappear at once. From this it is clear that *A. sexdens* has its nuptial flights in January and *A. cephalotes* in May.

These facts agree with the practical observations in the field. The marital flights of *A. sexdens* are observed mostly about New-year, also in the middle of the small rainy season. *A. cephalotes* awaits the first rains of the main rainy season, starting with its flights in April and ending in the second half of June. This species is most active in the month of May, but the nuptial flights are dependent on the number of rainshowers in this time of the year.

There is one other fact that attracts the attention. In both of the nests under observation, the development of sexual individuals started with a small number of females and later on suddenly a large number of males appeared. It seems that a kind of protogyny occurs, but that finally such a nest works as a male individual. However, other nests are observed in which the winged females dominate. In this way the intercrossing between the different colonies is procured.

These observations are of great importance for a more profitable control of the leafcutting ants. If the nests can be destroyed before the nuptial flights set off, the dispersion of the ants is eliminated too. This means that the nests of *Atta sexdens* should be attacked in the main dry season (September–November) before the rains of the small rainy season come in, while the most suitable time for killing *Atta cephalotes* is the small dry season in the first three months of the year.

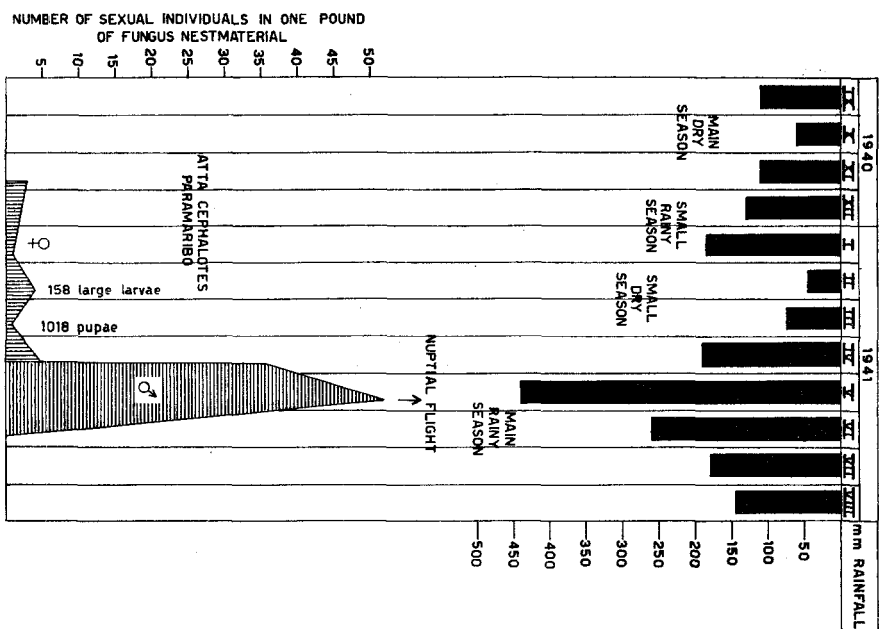
SAMENVATTING

In verband met de bestrijding van de parasolmieren *Atta cephalotes* en *Atta sexdens*, werd een onderzoek ingesteld naar de tijd van de ontwikkeling van de geslachtsdieren en het tijdstip van hun bruiloftsvluchten. Voor beide soorten bleek de ontwikkelingstijd in Suriname te liggen tussen October tot Mei van het daaropvolgende jaar, maar de huwelijksvluchten van *A. sexdens* vinden plaats gedurende de kleine regentijd omstreeks Nieuwjaar en van *A. cephalotes* bij het begin van de grote regentijd in Mei. De vernietiging van de nesten moet dus liefst voor deze data plaatsvinden om een verdere uitbreiding van de mieren tegen te gaan.

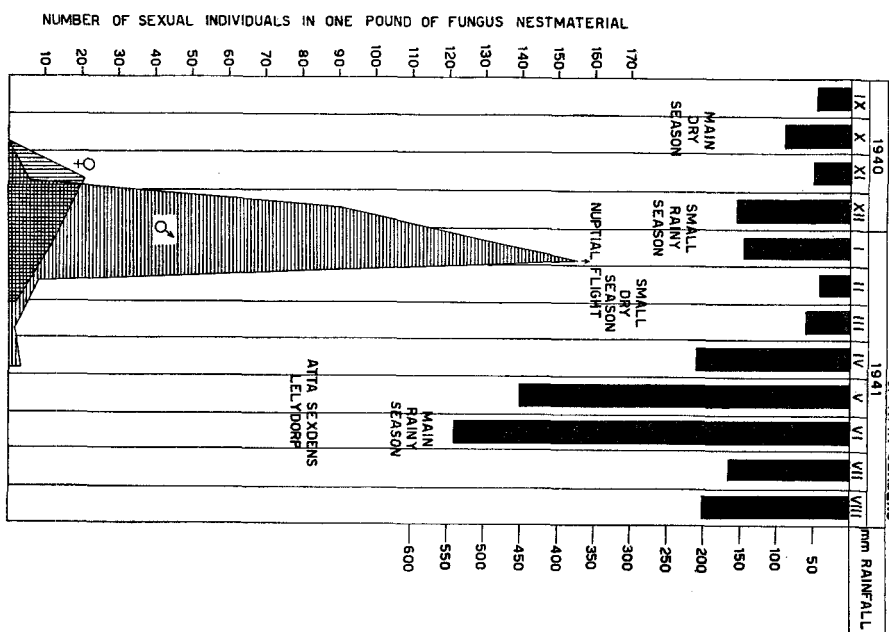
LITERATUUR

- BRAAK, C. – 1935. Het klimaat van Nederlandsch West Indië (The Climate of the Netherlands West Indies). Kon. Ned. Meteorol. Inst. No 102, Meded. en Verh. 36; Rijks-uitgeverij, 's-Gravenhage.
- STAHEL, G. – 1938. Ueber den Pilz der Gärten von *Atta cephalotes*. Anais da Primeira Reunião Sul-Americana de Botânica, Rio de Janeiro, vol. 1 : 207–213.

SEXUAL DEVELOPMENT OF ATTA CERPHALOTES



SEXUAL DEVELOPMENT OF ATTA SEXDENS



- STAHEL, G. – 1943. The Fungus Gardens of the Leaf-cutting Ants. Journ. N. York Bot. Gard. Vol. 44, No. 527 : 245–253, 6 foto's.
- STAHEL, G. & GEJSKES, D. C. – 1939. Ueber den Bau der Nester von *Atta cephalotes* L. und *Atta sexdens* L. (Hym. Formicidae). Rev. d. Entomologia (Rio d. Jan.), vol 10., fasc. 1: 27–78, 21 Textfig., 26 Taf.
- STAHEL, G. & GEJSKES, D. C. – 1940. Observations about temperature and moisture in *Atta*-nests. Rev. d. Entomologia (Rio d. Jan.), vol. 11, fasc. 3 : 766–775, 6 Textfig.
- STAHEL, G. & GEJSKES, D. C. – 1940. De Parasolmieren en hunne bestrijding. Dept. Landbouwproefstation Suriname, Bull. 56, 26 pp., 2 Pl.
- STAHEL, G. & GEJSKES, D. C. – 1941. Weitere Untersuchungen über Nestbau und Gartenpilsz von *Atta cephalotes* L. und *Atta sexdens* L. Rev. d. Entomologia (Rio d. Jan.), vol. 12, fasc. 1–2 : 243–268.