

A *DOLICHODERUS TASCHENBERGI* QUEEN FOUND IN A
POLYGYNOUS COLONY OF *D. PLAGIATUS*
(HYMENOPTERA: FORMICIDAE)

BY DIETHE ORTIUS

Theodor-Boveri-Institut
LS für Verhaltensphysiologie und Soziobiologie
Am Hubland, D-97074 Würzburg, Germany

ABSTRACT

Very little is known about colony founding strategies and social organization of the four North American species of the ant genus *Dolichoderus*. I here report the finding of a *Dolichoderus taschenbergi* queen in a colony of *D. plagiatus*, which suggests parasitic colony founding may occur occasionally in *Dolichoderus taschenbergi*. In addition, the colony contained three reproductively active queens of *D. plagiatus*, indicating that this species is facultatively polygynous.

INTRODUCTION

The ant genus *Dolichoderus* Lund is represented by four species in North America (Creighton, 1950): *mariae* Forel, *plagiatus* Mayr, *pustulatus* Mayr, and *taschenbergi* Mayr. Except for studies by Kanno (1959, 1967) on the flight activities of these species and a review by Johnson (1989) of their distribution and nest sites, very little is known about the life histories of North American *Dolichoderus*. Several authors (Wheeler, 1905a; Cole, 1940; Carter, 1962a, b; Wheeler and Wheeler, 1963) have described below-ground nest structures and leaf litter nests for all four North American *Dolichoderus*. *D. plagiatus* is considered to be monogynous (Kanno, 1967) and nuptial flights are known to occur between mid June and July (Kanno, 1959).

Among the 12 colonies censused by Kanno (1967), one colony contained two queens, which, however, he did not dissect. The majority of the *D. plagiatus* colonies investigated by

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Kannowski (1967) were monogynous, and the single polygynous colony found was interpreted as either a consequence of pleometrotic colony foundation (primary polygyny) or the adoption of young mated queens (secondary polygyny). The latter possibility has been considered unlikely because of the observed nuptial flight activities of this species, which disperses the females from their mother colony and the high intraspecific aggressiveness of the workers, which would make the adoption of nonrelatives impossible (Kannowski, 1959; 1967).

In the present note I report some new aspects concerning the nest sites and social organization of *Dolichoderus taschenbergi* and *D. plagiatus*. Voucher specimens are deposited in Harvard University's Museum of Comparative Zoology.

RESULTS AND DISCUSSION

During a collecting trip to Maine, USA, in September 1994, a colony of *Dolichoderus plagiatus* was found in a dead oak twig (from a dwarf tree of *Quercus alba*) on the ground. This report of a colony in dead wood and of others found on Mt. Monadnock, New Hampshire and Mt. Cadillac, Mt. Desert Island, Maine (Jürgen Heinze, pers. comm.) and of arboreal *D. pustulatus* in Florida and Georgia (Johnson, 1989) suggests that nest sites of *Dolichoderus* species are more diverse than previously reported.

The exact location of the nest was on the southeastern slope of Mt. Battie at an elevation of 330m in Camden Hills, Knox County, Maine. The colony contained 3 dealate queens, 2 alate queens, approximately 80 workers, and 1 worker pupa. Overwintering without brood seems to be typical for *Dolichoderus plagiatus*, *D. pustulatus* (Kannowski, 1967), and the European *Dolichoderus quadripunctatus* (Torossian, 1968). The two alate queens may have eclosed too late to take part in a nuptial flight and therefore remained in the mother colony for overwintering.

The dissection of all three dealate *D. plagiatus* queens revealed that they all had filled spermathecae and developed ovaries, each ovary containing 14 ovarioles and several yolky oocytes. Surprisingly, mingled among the *D. plagiatus* specimens was a dealate queen of *Dolichoderus taschenbergi*.

During the few days following collection the members of the host colony never exhibited any kind of aggressive behavior

towards the foreign queen. In contrast, the *D. plagiatus* workers clustered around the *D. taschenbergi* queen as they did around the dealate queens of their own species, forming little subunits in the collection-tube. It thus appears that the alien queen was as attractive to the workers as their own queens.

On the second day after collection the *D. taschenbergi* queen was observed grabbing a *D. plagiatus* worker behind her neck without any counterreaction of the other colony members. About 10 minutes later the worker was decapitated and was later removed by a conspecific worker. Unfortunately the *D. taschenbergi* queen did not survive the transport to the laboratory and further observations could not be made.

Even though this is not very strong evidence, these observations might suggest that *D. taschenbergi* queens occasionally use a parasitic mode of colony founding, with *D. plagiatus* serving as host species.

Temporary social parasitism is a well known phenomenon especially in the subfamily Formicinae (Hölldobler and Wilson, 1990). In the subfamily Dolichoderinae, however, it is rare. Ants of the genus *Bothriomyrmex* have long been believed to be the only temporary social parasites in this group (Forel, 1906; Santschi, 1906), founding their nests in colonies of the genus *Tapinoma*. Buren, Nickerson, and Thompson (1975) deduced temporary social parasitism from the finding of mixed nests of two *Dorymyrmex* species, now called *Dorymyrmex medeis* and *D. bureni*, (Trager, 1988).

The parasitized species, *D. plagiatus*, appears to be facultatively polygynous, as three co-occurring reproductively active queens have been found in this colony. As stated by Kanno (1959; 1967) there are two possible mechanisms by which polygyny might occur. Firstly, conspecific queens can either be adopted into established colonies (secondary polygyny), which seems to be likely for *D. plagiatus* as even heterospecific queens are sometimes adopted. Secondly, primary polygyny could arise through pleometrotic colony foundation. But this is a rather rare phenomenon in ants (Hölldobler and Wilson, 1977).

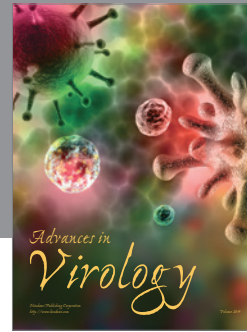
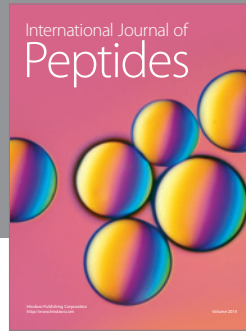
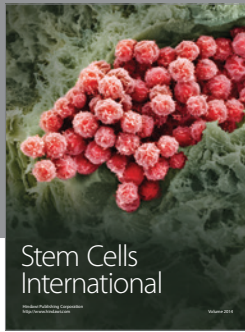
Further investigations will be needed to show if polygyny in *D. plagiatus* and temporary social parasitism in *D. taschenbergi* are common phenomena.

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