

## JOINT NEST USE BY TWO PAPER WASP SPECIES

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### SUMMARY

Two nests of *Polistes* paper wasps were occupied simultaneously by two species. One of the nests had been founded by a third species. Joint nest use has not been previously observed in *Polistes*, and it is not accommodated by genetic theories of hymenopteran social evolution.

### RÉSUMÉ

#### Utilisation simultanée du même nid par deux espèces de Guêpes du genre *Polistes*.

Nous avons trouvé 2 nids de Guêpes du genre *Polistes* qui étaient occupés par des individus appartenant à 2 espèces différentes. L'un des nids avait été fondé par une 3<sup>e</sup> espèce. L'utilisation simultanée du même nid par des espèces différentes n'a pas encore été observée et n'a pas été prise en considération par les théories génétiques de l'évolution des sociétés d'Hyménoptères.

On 1 June 1977 a nest of either *Polistes perplexus* or *P. carolina* was found under a building's eaves at Washington University's Tyson Field Tract near Eureka, Missouri. The nest of 12 cells contained four pupae and was attended by one foundress. The foundress and the nest were relocated to an observation shelter at a window of the building. The foundress was seen on the nest on 2 and 4 June, but she abandoned the nest on 5 June. On 10 June a female *P. fuscatus* was on the nest, which now had no brood. This female remained on the nest, laid eggs, and added new cells. On 24 July two female *P. metricus* were on the nest with the female *P. fuscatus*. The three wasps seemed to coexist peaceably during subsequent evening observations. By 3 August one male and three female *P. fuscatus* and a *P. metricus* female were on the nest. In following days a *P. metricus* was regularly present while the numbers of

*P. fuscatus* on the nest increased. The nest, containing four pupae, was collected on 18 August; in the collection were six male and three female *P. fuscatus* and one female *P. metricus*.

On 31 May 1977 a multiple-foundress nest of one *P. fuscatus* and two *P. metricus* females was found in a small shed on the John H. Nelson Environmental Study Area near Lawrence, Kansas. The nest was discovered approximately one week before any of the 31 other monitored *Polistes* colonies at the site produced workers. The nest of 34 cells contained 13 pupae, 8 larvae, and 13 eggs and was one of the larger of the 18 nests in the shed. The foundresses were marked for individual recognition and were recorded coexisting on the nest on 2, 4, and 7 June. Although dominance relationships among the foundresses were not definitely ascertained, the female *P. fuscatus* was twice seen carrying prey to the nest. It is thus likely that she was subordinate to one or both *P. metricus*, since queens of multiple foundress associations rarely forage for prey (Gamboa, in press). The nest was heavily parasitized by fly larvae (*Sarcophaga polistensis*), and on 8 June it was abandoned by all three foundresses, which were later captured for species determination.

We know of no other records of nest co-occupancy or cooperation between two species. In Missouri the co-occupancy continued for at least 26 days. Numerous *P. fuscatus* but no *P. metricus* were reared from the nest during this period. In Kansas a *P. fuscatus* foundress cooperated with and was possibly subordinate to one or two *P. metricus* foundresses in a pre-emergence colony.

The evolutionary significance of these observations is obscure. Joint nest use may be aberrant behavior that perhaps occurs rarely under conditions of high *Polistes* density. It may also represent initial stages of interspecific exploitation or mutualism. It is clear that cooperation between species cannot involve two of the genetic mechanisms, kin selection and parental manipulation, that have been advanced to explain social cooperation among Hymenoptera.

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#### REFERENCE

- GAMBOA (G. J.). — Division of labor and subordinate longevity in foundress associations of the paper wasp, *Polistes metricus* (Hymenoptera : Vespidae). *J. Kans. Ent. Soc.* (in press).
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