

**PARATRECHINA FLAVIPES (SMITH) (HYMENOPTERA: FORMICIDAE),
A NEW EXOTIC ANT FOR OHIO**

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Abstract.—The temperate eastern Asian formicine ant *Paratrechina flavipes* (Smith) is reported for the first time from Ohio. The collection locality (41°29'32"N, 81°35'34"W) in the Doan Brook Watershed of the Greater Cleveland area is the westernmost known occurrence of this ant in the continental United States.

Key Words: *Paratrechina flavipes*, Formicidae, exotic ants, Ohio, U.S.

The Formicinae genus *Paratrechina* Motschulksy includes 158 world species (Bolton et al. 2006), about 20 of which are found in North America. Five of the North American species are exotics, including the Asian *Paratrechina flavipes* (Smith) (Trager 1984). According to Trager (1984), *Paratrechina* is a common member of almost all continental ant faunas where suitable habitats can be found. The genus is most diverse in tropical Asia and Australia, but it is absent from most of Europe and from desert regions in other continents.

Paratrechina flavipes was first described from Japan (Smith 1874), but its native range includes Korea (Kupyanskaya 1990; Japanese Ant Image Database 2003; Bolton et al. 2006), mainland China (Japanese Ant Image Database 2003), Taiwan (Trager 1984), the Kuril Islands (Kupyanskaya 1990), and possibly the Philippines (Way et al. 1998). As with many other exotic species, *P. flavipes* probably was transferred to new areas via human commerce. Espadaler and Collingwood (2000) reported this species

from Spain, but its identity was later confirmed to be *Paratrechina vividula* (Nylander) (Gomez and Espadaler 2006). Based on the ecological preferences of *P. flavipes* and *P. vividula*, J. Trager (personal communication) suspects that the Oman (Collingwood and Agosti 1996) and United Arab Emirates (Collingwood and Agosti 1996; Collingwood et al. 1997) records are most likely also *P. vividula*, which is more suited to the hot, dry conditions in the Arabian Peninsula.

Paratrechina flavipes was first recorded in the United States from Philadelphia, PA, in 1939 (Trager 1984), and since has been found in Pittsburgh, PA (1955) (T. Nuhn, personal communication), Long Island, NY (Trager 1984), Washington, DC (1990) (T. Nuhn, personal communication, Antweb 2007), and Massachusetts (no locality listed, Bolton et al. 2006). According to Trager (1984) this species probably was brought to the United States in the early 1930s with potted plants or logs for growing mushrooms. A look at the Japanese ants picture database (Japanese Ant Image Database 2003) shows a

variety of colors of "flavipes," reflecting what are at least in some cases species differences. In any case, the specimens from Washington, D.C., Cleveland and in between match the types of *P. flavipes* from Hyogo, Japan (J. Trager, personal communication). Stefan Cover also suggests that *P. flavipes* might have come in first to D.C., along with *Vollenhovia emeryi* Wheeler imported with the several thousand cherry trees given to the people of the United States as a gift by the Japanese government and planted around the Tidal Basin and East Potomac Park in 1912 (Fisher and Cover 2007).

MATERIALS AND METHODS

Material studied.—We report *P. flavipes* for the first time from Ohio, extending its known introduced range westward in North America. The Ohio records are as follows: Ohio, Cuyahoga County, Shaker Heights, Doan Brook Gorge, 41°29'N, 81°35'W, altitude 256 m, 01.vii.2005, col. K. Ivanov and J. Milligan, 175 workers, 10 males, 1 female, Winkler extraction (vouchers deposited at the Cleveland Museum of Natural History); same location and date, 13 males, and 2 females (more observed but not collected) on a boulder next to a stream in a mating lek. Two square meters of leaf litter were collected in the Doan Brook Gorge of the Doan Brook Watershed, and all ants extracted in a Winkler apparatus for 72 h. This species occurred together with the following ant species (number in parentheses is the number of individuals collected from the litter extraction): *Amblyopone pallipes* (Halde man) (1), *Formica subsericea* Say (1), *Lasius nearcticus* Wheeler (52), *L. alienus* (Foerster) (24), *Aphaenogaster picea* (Wheeler) (9), *Stenamma impar* Forel (9), *S. schmittii* Wheeler (5), and *Temnothorax curvispinosus* (Mayr) (1).

An entire colony, consisting of 890 workers, 1 dealate queen, 64 alate females, and 32 alate males, was collect-

ed by K. Ivanov on 2 May, 2007 in the same general area. The colony was found in sandy soil under a small rock, on the steep gravelly eastern bank of the stream.

Description of the collection locality.—Doan Brook is a small headwater that is tributary to Lake Erie. The total length of Doan Brook is 9.4 m, and its watershed is 3,035 ha, most of which has been developed. A narrow riparian zone surrounds the stream on both sides for much of its length. Land use in the watershed is predominantly residential (85%), with only 12% of the area undeveloped, and much of this is park land adjacent to the stream. The stream is surrounded by secondary mixed deciduous forest patches, dominated by oak (*Quercus alba* L., *Q. rubra* L.), maple (*Acer rubrum* L., *A. saccharum* Marshall), American beech (*Fagus grandifolia* Ehrhart), and white ash (*Fraxinus americana* L.). A large number of non-native herbaceous species, such as garlic mustard (*Alliaria petiolata* (M. Bieb.) Cavara & Grande), privet (*Ligustrum vulgare* L.), bush honeysuckle (*Lonicera*), Bishop's weed (*Aegopodium*), and Japanese knotweed (*Polygonum cuspidatum* Siebold & Zucc.), are found throughout the watershed (MWH 2001).

RECOGNITION

Recognition (a center head).—The workers of *P. flavipes* are small (2.0–2.5 mm) with the head and metasoma are blackish brown, and the mesosoma and legs yellow to yellowish brown (Trager 1984; Collingwood et al. 1997). The sides of head are rounded, and the head is covered by fine dense yellow pubescence. The antennae are 12 segmented, with the scape exceeding the posterior margin of the head, and bearing 7 or more macrochaetae (5 visible in front view, Fig. 1a). The eyes are small and the ocelli small and indistinct, with all three visible. The presence of vestigial ocelli in *P. flavipes* may serve to distinguish it from other

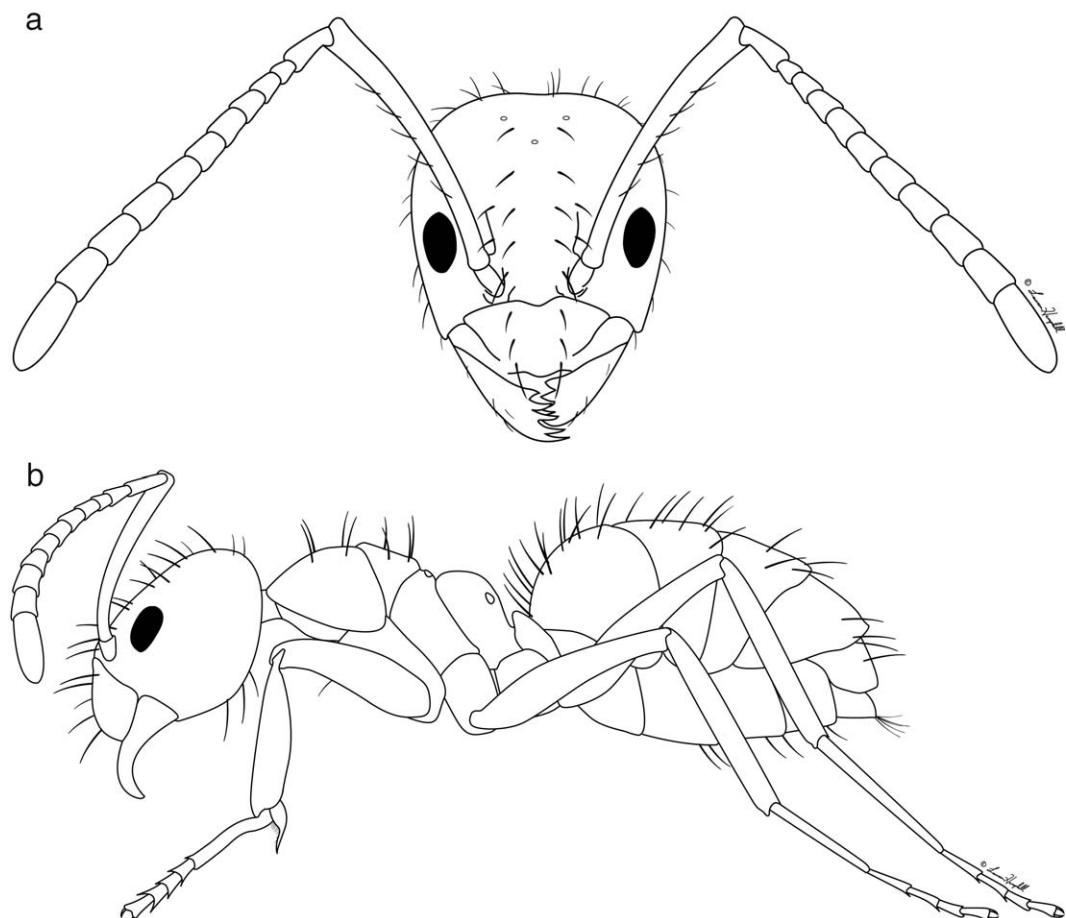


Fig. 1. Worker of *Paratrechina flavipes*. a, Head, dorsal view. b, Lateral view.

native and non-native North American species (including Ohio's *Paratrechina parvula* (Mayr)), except *P. austroccidua* Trager (Trager 1984). The latter is a southwestern mountain species only known from the US and Mexico. The mesosoma is slightly longer than the head with the pronotal dorsum convex in profile and occasionally somewhat angular. The mesonotal dorsum is flat in profile, and usually situated at the same level, or higher, than the propodeum. The pronotal and mesonotal dorsal surfaces bear 4–8 macrochaetae. The hind femora and tibiae bear erect or suberect hairs (Trager 1984).

In the field, this species superficially resembles *Prenolepis* or *Lasius*; however,

it can be distinguished easily from them by the presence of long, macrochaetae, arranged in pairs on the mesosomal dorsum. *Paratrechina flavipes* can be separated from the native, and closely related, *P. faisionensis* by its shorter scapes and legs, the arched thorax and propodeum, and the more intense yellow color of the mesosoma (Trager 1984). *Paratrechina faisionensis* is most often uniformly dark brown with tan to whitish meso- and metacoxae.

DISCUSSION

Little is known about the natural history of *P. flavipes* in its introduced range. It is an opportunistic species

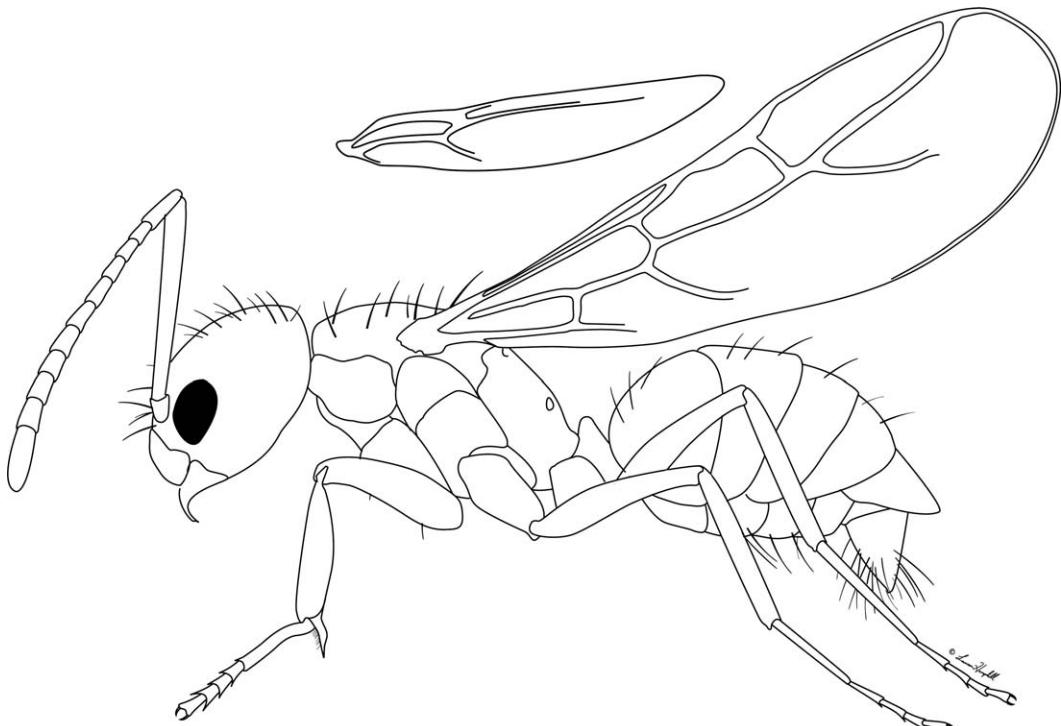


Fig. 2. Male of *Paratrechina flavipes*, lateral view.

(McGlynn 1999), feeding on plant nectar and small dead animals (Japanese Ant Image Database 2003). Nests are in the soil or the leaf-litter layer of moist primary or old secondary hardwood or mixed forests or forest patches (Trager 1984; Yamaguchi 2005); it has not been encountered in open habitats (Trager 1984). *Paratrechina flavipes* is common, and most successful, in urban areas, including parks and gardens (Collingwood et al. 1997). However, the latter most probably refers to *P. vividula*. A great deal of information about the biology of this species in its native range, comes from the work of Ichinose in Japan (Ichinose 1986, 1991, 1994a, 1994b). Mating flights have been recorded in April (Japan), and May (Pennsylvania, US) (Trager 1984), and during May and June (Japanese Ant Image Database 2003). Finding alate reproductives inside a nest in May, and outside nests in early June, coincides with

these records and implies that the North American populations are reproducing at the same time of the year as populations in their native range.

Paratrechina flavipes has not been reported as a pest, or as an ecologically dominant species, outside its native range. Beyond distributional data, however, we have no clear understanding of the biology and ecology of this species in its introduced range. Therefore, its impact on native biota, though hypothesized to be minimal, is still unknown. *Paratrechina flavipes* seems to thrive in highly disturbed inner city parks and wooded green spaces, where it can be numerically dominant (K. Ivanov, personal observation). The fact that *P. flavipes* is an opportunistic species with well-established populations outside of its native range, however, should not be ignored.

Since its first collection in the late 1930s, *P. flavipes* apparently has spread north-

ward and westward in the continental United States. If we assume that the species first became established in the vicinity of Philadelphia (PA) or Washington, DC, it since has spread northward to Long Island and Massachusetts and westward into Pittsburgh and Cleveland. Alternatively, there may have been multiple introductions in different locations. *Paratrechina faisionensis*, an uncommon species in northeastern Ohio, has been found only on a single occasion in the same general area (Ivanov, personal observation), but not in the same location as *P. flavipes*. This distributional pattern supports Trager's (1984) suggestion that either one of these two species may displace the other under certain conditions. *Paratrechina faisionensis* is more common in southern Ohio, and in southern US in general, and according to Trager (1984) it might have prevented the spread of *P. flavipes* further south in the US, where that species could possibly thrive.

Additional sampling and molecular (DNA) analysis are needed in order to establish if this species is expanding its range in the United States through natural dispersal or if new populations are being founded through human activities, both from overseas and within the US.

ACKNOWLEDGMENTS

We thank Joe Keiper (Cleveland Museum of Natural History) and James Trager (Shaw Nature Reserve, Gray Summit, MO) for their comments on the early versions of the manuscript, as well as Terry Nuhn (Systematic Entomology Laboratory, USDA) for providing information on the distribution of *P. flavipes* in the US. We also thank Lauren Hemphill (Cleveland Institute of Art) for the *P. flavipes* illustrations.

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