

# Invasive Ant Threat



INFORMATION SHEET Number 5 • Genus *Formica* Linnaeus

Risk: Medium

## Genus *Formica* Linnaeus

### Taxonomic Category

Family:	Formicidae
Subfamily:	Formicinae
Tribe:	Formicini
Genus:	<i>Formica</i>

**Common name(s):** wood ants (particularly *rufa* species group), field ants (www43), yama-ari-zoku

**Original name:** *Formica* Linnaeus

**Synonyms or changes in combination or taxonomy:** *Coptoformica* Müller, *Adformica* Lomnicki, *Formicina* Shuckard, *Hypochira* Buckley, *Iberoformica* Tinaut, *Neoformica* Wheeler, *Raptiformica* Forel, *Serviformica* Forel

There are about 150 currently valid species.

### General Description (worker)

#### Identification

**Size:** almost monomorphic; total length around 3.5–7.0 mm.

**General description:** antennae 12-segmented, without a conspicuous club. Eyes relatively large. Ocelli distinct. Mandibles rather slenderly triangular; usually with 8 teeth. Third tooth, counting from apex (bottom), always distinctly smaller and shorter than fourth; the fourth larger than all teeth above it. Frontal area distinctly margined. Frontal carinae sharply raised but short; a little divergent posteriorly. Metanotal groove distinct. Propodeum distinctly lower than promesonotal dorsum. Propodeal spiracles slit-like and situated away from the posterior margin of the propodeum. Metapleural gland present. One node (petiole) present, transversely scale-like in form, with a sharp carina ventrally. Hind tibia with a double row of setae along the inner surface, otherwise without conspicuous pubescence. Stinger lacking; acidopore present.

**Note:** Ants of the genera *Lasius* and *Formica* are the most dominant and abundant in the Holarctic region, but they are difficult to distinguish. Detailed generic diagnostic characters are given in Agosti & Bolton (1990), including the following:

*Lasius*: frontal carinae rounded and inconspicuous; propodeal spiracles round and situated near the posterior margin of the propodeum; hind tibiae with a double row of distinct setae, never thickly pubescent.

*Formica*: frontal carinae sharply raised; propodeal spiracles slit-like and situated away from the posterior margin of the propodeum; hind tibiae without a double row of setae, often thickly pubescent.

Sources: www1

Key: Bolton 1994, Agosti & Bolton 1990

## Behavioural and Biological Characteristics

Members of this genus exhibit a variety of habits and various methods of nest founding and nest construction (www13).

### *exsecta* species group

Ants of this group build large mounds often in clusters in fields, woods, or at the edge of woods. The nest founding female may behave as a temporary social parasite, but colonies are also founded by budding. These fierce ants kill other ants by decapitation, a unique characteristic.

### *fusca* species group

Members of this group nest in the soil, and the nest is commonly started under objects or at the base of tufts of grass. Excavated soil may be spread out in the form of an irregular crater or low mound about the nest openings. Because of their ubiquity and usual docility, they are common hosts for many of the slave-making species of *Formica*.

### *microgyna* species group

Species of this group are believed to be temporary social parasites of other species of *Formica*. The female is adopted by workers of the host species, and proceeds to kill or drive off the host queen. Host workers may remain in the colony after the intruding queen has established her own brood, but eventually die off. Most species are found in open woods or meadows. The nests are usually of the thatch type, but the thatching is normally scattered about the nest openings and appears as a flattened disc.

### *neogagates* species group

Species of this group form small colonies of a few hundred individuals that nest in the soil, sometimes under stones or beneath other objects. They are commonly enslaved by members of the *microgyna* and *sanguinea* groups. Although they are the smallest species in the genus *Formica*, they can be quite pugnacious to human intruders.

### *pallidefulva* species group

Members of this group nest in the soil under stones or at the base of tufts of grass. Colonies are relatively small, and the nests are often obscure and hard to locate. These ants are exceedingly timid and will usually make no effort to defend their nest.

### *rufa* species group

The nest architecture of members of this group is varied with some species building mounds and others making considerable use of thatching. Nests are usually started beneath objects. Nest founding females of some species may behave as temporary social parasites.

### *sanguinea* species group

These ants are facultative slave makers. They raid nests of other ants and capture the developing offspring. Some of the captured larvae and pupae are eaten but others are reared as slave workers. The presence of slaves may enhance the colony's success, but colonies may also flourish without slaves. Nest founding is believed to be through temporary social parasitism. Nest founding females forcibly enter small colonies of the host species and kill or drive off the host workers before rearing the host brood for their own use. Hosts are other species of *Formica*. The one European species in this group, *F. sanguinea*, has been extensively studied for almost 200 years. Comparatively little is known about the natural history of the Nearctic species.

### *Habitats occupied*

The genus is rarely found in habitats with less than 250 mm of rainfall per year, and most of the species are found in the temperate zones with deciduous or coniferous trees. In North America the distribution extends further in to xeric and desert areas than in the Palearctic region.

### *Dispersal*

In those species that form colonies they are founded by swarming reproductives (www51) or budding (www13). In some species effective female dispersal is extremely restricted (Liautard & Keller 2001; Reuter & Keller 2003).

## **Global Distribution (See map)**

### *Native to*

The distribution of *Formica* is exclusively Holarctic, and they are more common, abundant, and diverse in the northern part of their range. In the far north it is not uncommon for them to be the dominant ants (Agosti 1994).

### *Introduced to*

Two species (*F. lugubris* and *F. subpolita*) are recorded as introduced into Canada (Francoeur 1977).

### *History of spread*

Only two species have been recorded outside their native range, and in both cases in only one country, suggesting reproductives of this genus are transported infrequently or have very low probabilities of establishment (which in many cases may relate to the social parasitism habits).

### *Interception history at NZ border*

Only 2 interceptions of unidentified *Formica* species are recorded: one from a container from Italy; the other in timber from Canada.

## **Justification for Inclusion as a Threat**

An abundant ant genus in cold climates and a particularly important component of forested habitats of the northern hemisphere (Lenoir et al. 2003). Some species form large polydomous colonies extending over several hectares (Cherix & Bourne 1980; Rosengren et al. 1985) and are commonly the dominant ant (Agosti 1994). They occupy a range of ecological niches (www13), and some species are capable of altering invertebrate community structure (e.g., Cherix & Bourne 1980, but see also Lenoir et al. 2003). These ants have strong biting jaws and also smear the bitten area with formic acid, which increases the degree of irritation caused. They sometimes invade houses and can be a pest in recreational areas (www13).

### *Mitigating factors*

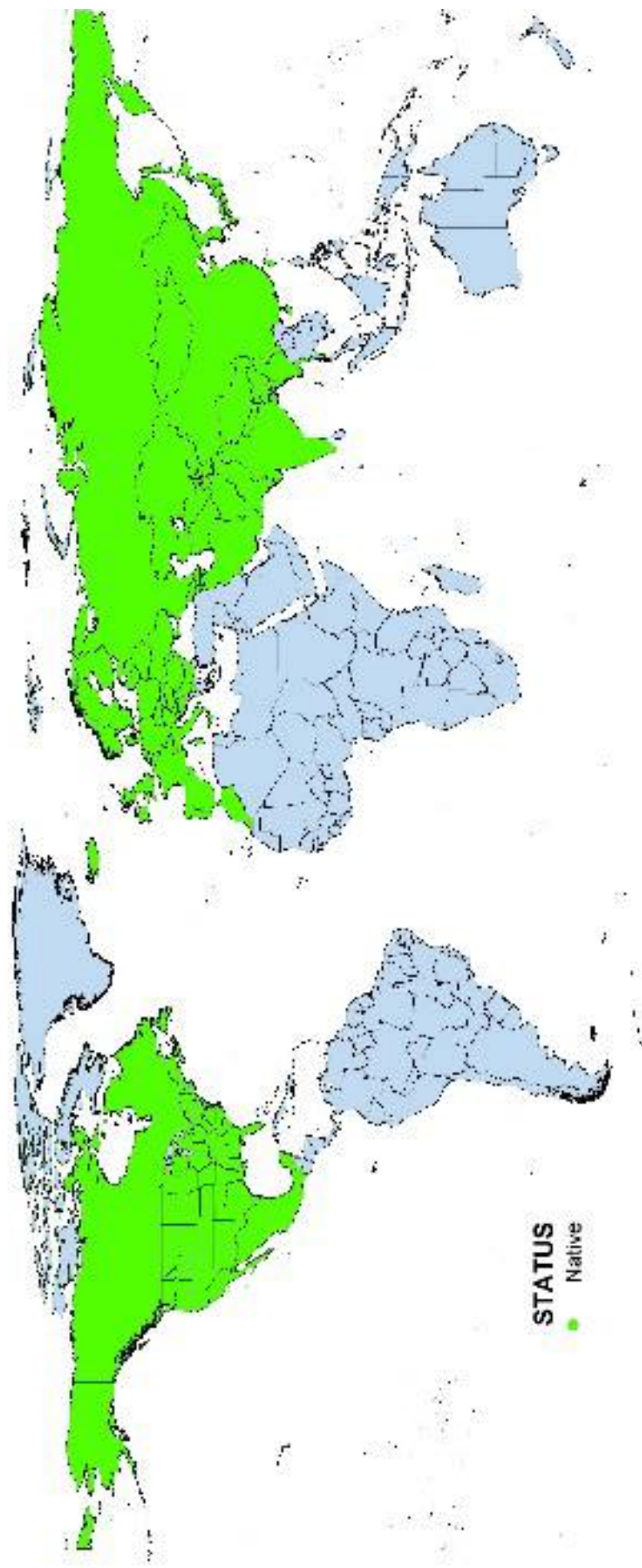
Not present in the southern hemisphere. Only two species have been recorded outside their native range (both in Canada – Francoeur 1977, one of which was introduced deliberately as predator of the Swaine jack pine sawfly, *Neodiprion swainei* (www13)), suggesting reproductives of this genus are transported infrequently or have very low probabilities of establishment (which in many cases may relate to the social parasitism habits). Only 2 interceptions of unidentified *Formica* species are recorded: one from a container from Italy; the other in timber from Canada. Although abundant not considered

a keystone species affecting other components of the community (Lenoir et al. 2003).

### **Control Technologies**

The large soil mounds of many species make nests easy to locate, and the common approach to control is spot treating of individual nests (www51; www52), such as using Cypermethrin, which for *Formica exsectoides* Forel is more effective than baits (www51).

*Compiled by Richard Harris and Jo Berry*



Global distribution of Genus *Formica* Linnaeus