Biodiversity value of nut trees:

Use of nutshells by ants in eastern Ontario planted nut groves

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Nut trees support much more diversity than many other kinds of trees, and many other vascular plants. The nuts themselves are part of the reason for this since they are eaten by mammals, birds, and a variety of insects. The empty nutshells are also used as home sites by various insects, spiders and mites. In fact, there are some species of ants that nest in relatively small cavities, and almost exclusively in nutshells in parts of their range. In mid-October 2025, we made a brief survey of ants in nutshells in planted nut groves in various parts of eastern Ontario.

Fig.1. Right. Portion of an empty walnut shell 3.7 cm across with the tip chewed off by a rodent (based on incisor marks) leaving an access opening 2.5 x 1.5 cm to the inner chambers. Left. A queen of Odorous House Ant (*Tapinoma sessile,* 3.5 mm long) found in this nut which also had 440 workers (2.5 mm long) and approx. 100 eggs and small larvae. Oak Valley Nut Grove (Pioneer Park), photos by P.M. Catling, 17 Oct. 2025.

Methods

To be used by ants, the nutshells must be empty and have an entrance into the cavity. The opening on the shell can be made by a beetle larva (a weevil) or by rodents, particularly squirrels. Many nutshells chewed by rodents are too damaged to be a satisfactory home for ants. The opening should be less than a few mm. Only a portion of the nutshells chewed by rodents have single, or a few small openings, as a result of being discarded without consuming all the contents. Often potentially appropriate nutshells for ants are less than 5% of the nutshells on the ground, and the nuts on the ground that actually have ants, are less than 5% of those with potential. Nut trees do sometimes produce a large number of nuts. We collected up to 20

potential nutshells from bases of nut trees or nearby rodent caches. Shagbark Hickory nuts were broken with pliers, but Black Walnuts required a hammer. Ants were identified, counted, and notes on brood were recorded. Common and scientific names of ants are taken from Ellison *et al.* (2012).

Fig. 2. Part of a hickory nut 3.1 x 1.8 cm with a crateriform hole 2 mm in diameter and rodent incisor bite marks. The nut contained: (1) 140 *Temnothorax longispinosus* workers and a queen, (2) approx. 300 larvae and eggs presumably belonging to *T. longispinosus* (based on presence of queen), and (3) 60 workers of *Lasius alienus* possibly using the nutshell as temporary cover. Long Sault Nut Grove, photo by P.M. Catling 17 Oct. 2025.

Results

We found sixteen occurrences of ants in nuts at three nut grove sites (Table 1). These occurrences involved 6 species of ants, of which 5 were apparently using the nutshells as nesting sites based on presence of immature stages (Table 1). The nuts included Shagbark Hickory (*Carya ovata*), Black Walnut (*Juglans nigra*), and Heartnut (*Juglans ailanthifolia*).

All of the nutshells which contained ants in the groves that we visited had crateriform entrances with toothmarks that were chewed by rodents (Figs.1 and 2). Although we examined several Red Oak acorns with exit holes made by weevils in Oak Valley, they had no ants. We also examined about 20 American Hazel hybrid nuts but they also had no ants. In the nut groves we visited, the ants were completely dependent on the rodents to gnaw the holes in the nutshells.

Two of the ant species that we found characteristically occur in small cavities, and particularly in nutshells of Shagbark Hickory in natural stands in Ontario (Catling *et al*. 2025). These are *Temnothorax longispinosus* and *Temnothorax ambiguus*. The related species *Temnothorax schaumii* was found in one nut but was not nesting there (Table 1).

Lasius alienus had five occurrences in grove nuts and was nesting in four of them. This common species is not as restricted to nuts to the extent that *Temnothorax longispinosus* and *T. ambiguus* are.

Tapinoma sessile was nesting in a walnut shell with a large opening (Fig. 1) lying face-down in deep litter. This suggests that nuts with larger openings may be used by some cavity nesting species if the orientation in litter reduces access by predators. The occurrence of 440 adults seems to be a large number since only about half of the nutshell was occupied by the tightly packed assemblage of ants, which was perhaps a hibernation gathering, but was also an active colony with immatures (Table 1).

The presence of several European Fire Ants (*Myrmica rubra*) in some nuts was a surprise since these ants are large for cavity-nesting, and are not generally associated with nuts. The fact that

the occupied nutshells had large ant larvae raises the question of whether or not these ants were using the nuts as small nests, or as a result of a queens laying eggs in the nuts, and then moving on due to limited space.

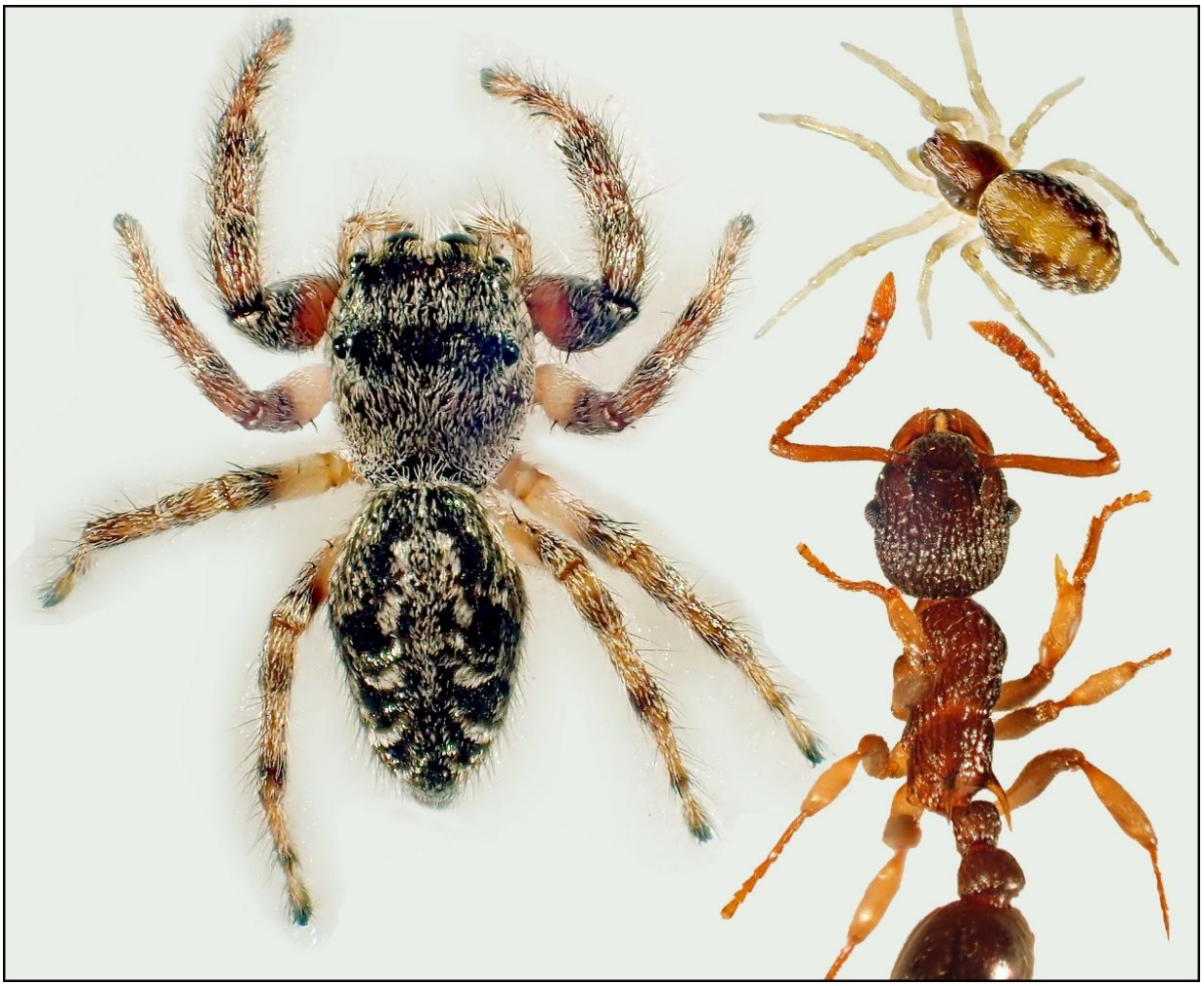

Fig. 3. European Fire Ants (*Myrmica rubra*, lower right) were found in a Walnut and a Shagbark Hickory nutshell along with the spiders illustrated here (upper left and upper right). During the very brief (one day) ant survey at least 10 different species of spiders were found in empty nutshells. Long Sault Nut Grove, photos by P.M. Catling, 17 Oct. 2025.

Conclusions

Nutshells provide important homes and cover for ants. *Myrmica rubra, Tapinoma sessile* and *Lasius alienus* may not have previously been reported nesting in nutshells. Other observations noted here, such as the occurrence of more than one species of ant in the same nutshell, ants sharing nutshells with spiders, and nutshells with adults and larvae but no queens, all raise some interesting questions which require more study.

With six species of ants nesting in nutshells, some as nut specialists, and numerous other animals feeding particularly on the nuts, it is clear that nut trees have biodiversity value based on the nuts alone, regardless of the unusually large diversity of species that feed on the foliage. Many hundreds of ants (540 in half of a walnut shell), provide food directly and indirectly to many species of larger animals. Planted groves of nut trees, especially those receiving slightly less intense manicuring, may have substantial biodiversity value. Nuts are not just a nutritious meal for people, they are a biodiversity treasure, - and nut groves are more than an opportunity for protection of significant nut germplasm, - they can also be an important part of a diverse ecosystem.

For more information on the Eastern Ontario nut groves see the Eastern Chapter of the Ontario Nut Grower's Association webpage [ECSONG's Public Nut Groves - ECSONG](). .

Fig. 4. The Doubtful Temnothorax (*Temnothorax ambiguus*) is most often found in nutshells. The queen (3.5 mm long) shown here (3 views of same individual) was found in a Shagbark Hickory shell 2 cm long with 21 workers and approx. 50 eggs and small larvae, on 10 Oct. 2025. The trees were planted on Dolman Ridge east of Ottawa approx. 20 years ago. The ants probably used the empty acorns of Red Oak and Bitternut Hickory which are native on the site. Nuts of the latter do not last as long as Shagbark Hickory nutshells and are scarce in the area now, perhaps due to climate change-induced drought. Dolman Ridge, Ottawa, photos by P.M. Catling,10 October 2025.

-References

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Ellison, A.M., N.J. Gotelli, E.J. Farnsworth, and G.D. Alpert. 2012. A field guide to the ants of New England. Yale University Press.

Table 1. Locations, ants present, host nut, and notes.

Name of ant	Location	Notes
Lasius alienus, CORNFIELD ANT	Long Sault, Centre Woodlands Island	in walnut 2.9 x 2.3 cm, 19 adults, no immatures or eggs
Lasius alienus, CORNFIELD ANT	Long Sault, Centre Woodlands Island	in heartnut 3.5 cm long x 3 cm wide, 110 adults, approx. 100 small larvae and eggs, + a queen of *Temnothorax schaumii*
Lasius alienus, CORNFIELD ANT	Long Sault, Centre Woodlands Island	in hickory nut 3.6 x 1.9 cm, 67 adults approx. 20 small larvae
Lasius alienus, CORNFIELD ANT	Long Sault, Centre Woodlands Island	in hickory nut 3.1 x 1.8 cm with 140 *Temnothorax longispinosus* (including 1 queen), as well as 300 larvae and eggs, and 60 *Lasius alienus*
Lasius alienus, CORNFIELD ANT	Long Sault, Centre Woodlands Island	in walnut 2.6 x 2.4 cm, 200 adults (1 queen) + 110 eggs and small larvae
Myrmica rubra, EUROPEAN FIRE ANT	Long Sault, Centre Woodlands Island	in hickory nut, 3.1 x 2.0 cm 9 adults + 2 medium -sized larvae
Myrmica rubra, EUROPEAN FIRE ANT	Long Sault, Centre Woodlands Island	in walnut 2.5 x 2.6 cm, also a small orb spider (Fig. 3)
Myrmica rubra, EUROPEAN FIRE ANT	Long Sault, Centre Woodlands Island	in hickory nut 2.4 cm long x 1.5 cm wide, also occupied by a jumping spider (Fig. 3)
Myrmica rubra, EUROPEAN FIRE ANT	Long Sault, Centre Woodlands Island	in hickory nut 2.5 cm long x 2.6 cm wide, 9 adults, 5 pupae
Myrmica rubra, EUROPEAN FIRE ANT	Long Sault, Centre Woodlands Island	in walnut 2.5 x 2.6 cm, 3 adults, no immatures
Tapinoma sessile, ODOROUS HOUSE ANT	Oak Valley, Inkerman	in a portion of a walnut approx. 3.5 x 3.7 cm with a 2.5 x 1.5 opening at the terminal end, 440 adults, one queen 4.5 mm long, approx. 100 eggs and small larvae (Fig. 1)
Temnothorax ambiguus, DOUBTFUL TEMNOTHORAX	Dolman Ridge, Ottawa	nest in rotting Shagbark Hickory nut 2 cm long (including point), 57 adults, 1 queen, approx. 30 eggs and small larvae
Temnothorax ambiguus, DOUBTFUL TEMNOTHORAX	Dolman Ridge, Ottawa	nest in rotting Shagbark Hickory nut 2.8 cm long (including point), 62 adults, 2 queens, approx. 30 eggs
Temnothorax ambiguus, DOUBTFUL TEMNOTHORAX	Dolman Ridge, Ottawa	nest in rotting Shagbark Hickory nut 2 cm long (including point), 21 adults, 1 queen, approx. 50 eggs and small larvae
Temnothorax longispinosus, LONG-SPINED TEMNOTHORAX	Long Sault, Centre Woodlands Island	in Shagbark Hickory nut 3.1 x 1.8 cm with 140 *T. longispinosus* (incl. 1 queen) and 60 *Lasius alienus* and 300 larvae and eggs of unknown identity
Temnothorax schaumii, SCHAUM'S TEMNOTHORAX	Long Sault, Centre Woodlands Island	1 queen in heartnut 3.5 cm long x 3 cm wide, with 110 adults of *Lasius alienus* (listed above)