

**NOTE****The nests of *Dolichovespula norvegicoides* (Hymenoptera: Vespidae) from Newfoundland**

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The yellowjacket wasps (Vespidae) are well-known by people because of their conspicuous nests and their stinging abilities. The nests are constructed of paper produced by workers from masticated plant material. Many members of the Vespidae construct their nests in or close to the surface of the ground but some produce impressive aerial nests that are located on tree branches or under any projecting surface such as a building eave. New colonies are initiated by a single fertilized queen, the only member of the colony to survive the winter, usually in protective sites in the soil, under loose tree bark or in decaying stumps (Akre et al. 1981). In Newfoundland, vespids queens normally emerge around the end of May or early June and locate a new nest site (B. Hicks, College of the North Atlantic (CofNA), personal observation). For additional vespids life history information refer to Akre et al. (1981) or (Archer 2010). Newfoundland and Labrador has 11 species of vespids wasps occurring in two genera; *Vespula* and *Dolichovespula* (Table 1).

The northern aerial yellowjacket wasp, *Dolichovespula norvegicoides* (Sladen), occurs widely throughout the boreal region and further south along mountain ranges in North America (Kimsey and Carpenter 2012). The biology and nesting habits of this species are not well-known. To date, 12 nests have been located and analysed from various locations throughout North America (Bequaert 1932; Akre et al. 1981; Akre and Bleicher 1985; Akre and Myhre 1994).

There are some inconsistent observations on the nesting habits of *Dolichovespula norvegicoides* in the literature. The two earliest records indicated that the nests occurred in shrubbery 10 — 15 cm above ground (Bequaert 1932; Akre et al. 1981). Three additional nests were collected from protected areas; inside a log; supraterrrestrial or half in ground in the side of a hillock; and under a sheet of plywood (Akre and Bleicher 1985). The idea of supraterrrestrial nests was based on the shape and composition of the paper envelope compared to known species that produce aerial nests (i.e., *Dolichovespula arenaria*). Akre and Myhre (1994) described seven nests; six of the colonies occurred in low shrubs, three were located 30 — 34 cm above the ground, one 133 cm above the ground, and two touching the ground. One of the nests touching the ground was described as supraterrrestrial, however no soil was excavated. Instead, the workers had removed the leaf debris before constructing the nest. The seventh colony was located 6.7 m above ground, halfway under a mossy layer in the crotch of a large maple tree (Akre and Myhre 1994).

Despite Archer (2006) and Kimsey and Carpenter (2012) suggesting that this species typically builds small aerial nests, the production of supraterrrestrial nests or nests in protected areas on occasion cannot be discounted. Akre and Bleicher (1985) suggested that the occurrence of supraterrrestrial nest type may be more commonly produced but also more easily missed. As there is inconsistency in the characterization of nests of this species, it is important to document nest characteristics from different geographical localities. We describe two supraterrrestrial nests of *Dolichovespula norvegicoides* collected in Newfoundland, Canada.

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**Table 1.** The jellowjacket wasps (Hymenoptera: Vespidae) that occur in Newfoundland and Labrador according to the taxonomy of Kimsey and Carpenter (2012).

Species	Notes
<i>Dolichovespula arctica</i> (Rohwer)	Uncommon, NF, Parasite of <i>Dolichovespula arenaria</i>
<i>Dolichovespula arenaria</i> (Fabricius)	Very common; NF&Lab; aerial nest in trees and under building eaves
<i>Dolichovespula maculata</i> (Linnaeus)	Uncommon; unknown distribution; mostly aerial nest in trees; largest yellowjacket
<i>Dolichovespula norvegicoides</i> (Sladen)	Common; NF&Lab; aerial nests in coniferous forest
<i>Dolichovespula albida</i> (Sladen)	Lab; various nesting habitats (aerial and subterranean)
<i>Vespula acadica</i> (Sladen)	NF; nests mostly in or on the soil.
<i>Vespula infernalis</i> (de Saussure)	Uncommon; NF; parasite of <i>Vespula acadica</i>
<i>Vespula consobrina</i> (de Saussure)	Common; NF&Lab; nests in or on the soil
<i>Vespula intermedia</i> (du Buysson)	Lab, various nesting habitats (aerial and subterranean)
<i>Vespula alascensis</i> (Packard)	NF, most subterranean but can be aerial
<i>Vespula germanica</i> (Fabricius)	NF, uncommon, introduced

## METHODS

In July 2012, we received two worker specimens from two different locations in Newfoundland for identification. These specimens were determined to be *Dolichovespula norvegicoides*. Nest one, located in Carbonear, NL (43°44'25.30"N, 53°12'33.37"W), occurred inside a half wooden barrel that was being used as a flower planter. This nest was excavated on 15 September 2012. No living wasps were apparent at this time because the nest was sprayed with commercial wasp killing insecticide by the homeowner earlier (late July). Nest two occurred behind a rock wall in Corner Brook (48°56'05.29"N, 57°56'39.92"W). This nest was excavated on 26 September 2012. Similarly, no living wasps were present during the excavation because the homeowner had also sprayed the nest with insecticide.

The excavated nests were transported to the laboratory and placed at -20 °C until a convenient time for detailed examination. During June and July 2013, each nest was examined. The contents of the nests were noted along with the number of comb cells. The diameters of randomly selected cells were measured using LAS measurement software and a Leica MZ6 stereomicroscope.

## RESULTS AND DISCUSSION

### Nest 1 (Carbonear)

The wasps entered through a small hole in the side of the barrel near ground level. Upon excavation, the nest was located in the bottom of the planter inside a rounded cavity in the Styrofoam that appeared to have been chewed out by the wasps (Figure 1). Only small remnants of nest envelope

**Figure 1.** Location of the nest of *Dolichovespula norvegicoides* from Carbonear, Newfoundland with the contents of a barrel planter turned upside down and the Styrofoam block removed to show where the bottom of the nest was resting (a) and a view of the bottom of the nest located within a circular region of the Styrofoam (b)..



remained, revealing three combs (Table 2). At the time of excavation the combs were collapsed and there was no space between them. The poor condition of the nest was due to the spraying with insecticide. A total of 849 cells occurred on the three combs. The top and the bottom combs had similar number of cells with similar diameters (Table 2). The middle comb was larger and had more and larger cells (Table 2). Sixty-two dead wasps were found in the nest.

### Nest 2 (Corner Brook)

This nest was located behind a rock wall. The homeowner noticed the adult wasps entering and leaving from beneath one of the rocks. When the rock was removed in the autumn, the nest was easily observed in a cavity behind the rock (Figure 2). The envelope was composed of only 2 layers and appeared to be crumbled away from the combs. This nest was smaller than the Carbonear nest; containing three combs with 560 cells in total (Table 2). The top and bottom combs were the largest and contained cells with the larger diameters; the middle comb was the smallest and had cells with the smallest diameters. Only seven adult wasps were found in the nest.

The nests described in the present study are comparable

**Table 2.** Characteristics of two nests of *Dolichovespula norvegicoidea* collected from Newfoundland.

Locality	Comb	Size (cm)	No. of capped cells	Total cells	Cell diameter (mm)*
Carbonear	top	8.7 x 6.75	17	246	4.83 (4.1-5.1)(24)
	middle	9.9 x 9.1	91	316	4.94 (4.7-5.2)(36)
	bottom	9.5 x 7.9	47	287	4.75 (4.4-5.2)(35)
Corner Brook	top	6.85 x 6.7	24	238	4.90 (4.8-5.2)(25)
	middle	4.9 x 4.6	7	120	4.62 (3.9-5.1)(15)
	bottom	7.2 x 6.25	20	202	4.81 (4.5-5.3)(30)

\* Mean of cell diameter with range and number cell examined.

**Figure 2.** Nest location of *Dolichovespula norvegicoidea* from Corner Brook, Newfoundland showing the rock wall with nest entrance (a), the rock removed to show the small cavity containing the nest (b), and a close-up of the top of the nest in the cavity (c).



in comb diameter and number of combs to the nests described by Akre and Bleicher (1985). The three nests that these authors examined occurred in protected locations. They suggested that the nest envelope of *Dolichovespula norvegicoidea* was much less durable than either of the aerial nests of *Dolichovespula arenaria* or *Dolichovespula maculata* and because of that, *Dolichovespula norvegicoidea* nests would be more susceptible to damage if they were located in exposed areas. Akre and Myhre (1994) described seven colonies, all of which were in exposed areas above ground and had an average of 1284 cells on 3 — 5 combs. Their nests had an average of 24.5 layers of envelope. The nests of *Dolichovespula norvegicoidea* described from Newfoundland did not have any significant layering of envelope and were smaller, with 560 and 849 cells on 3 combs. Akre and Myhre (1994) also reported worker cell diameter averaging 4.8 mm and reproductive cells averaging 6.4 mm. The cells examined in the nests from Newfoundland had similar diameters to their worker

cell diameters but no large cells were observed. In fact, the largest diameter recorded was only 5.28 mm. This indicated that workers were being produced at the time the contents of the nest were killed by insecticide application, but reproductive cell production had not yet started. Archer (2006) reported that as colonies of vespids become larger, a proportionally greater number of larger cells are produced. This is attributed to the increase in the abundance and quality of food over the summer.

The Newfoundland climate is described mainly as cool maritime. The growing season is short and while the winters are not considered harsh compared to mainland areas, cool temperatures and rainy weather extend into mid-June (Banfield 1983). Because of that, it has been suggested that vespid colonies are initiated in late June with worker production during July and queens and males produced in late August (Hicks et al. 2011). The nests are naturally terminated in late September or early October when the first frosts occur (Hicks et al. 2011).

This is the first record of nests of *Dolichovespula norvegicoidea* being observed from Newfoundland. While this is a fairly common vespid, its nests have not been examined until now. Other vespids that produce aerial nests in Newfoundland, i.e., *Dolichovespula arenaria*, are well-known because their nests are commonly observed (Hicks et al. 2011). We suggest that *Dolichovespula norvegicoidea* wasps in Newfoundland produce mostly, if not exclusively, nests in protected locations. Nests in protected areas, including supraterrrestrial nests, will be sheltered from damaging frost, rain and winds that are frequent in the spring and early summer. Such nests will be limited in size because of the limited space they occupy.

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