

A new species of *Capis* (Lepidoptera: Noctuidae) from Québec, Canada

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Abstract—*Capis archaia* sp. nov., a new species of Noctuidae (Lepidoptera), is described from Québec, Canada. The species is included in the genus *Capis* Grote, 1882, a trifold genus in the subfamily Eustrotiinae. Adults and genitalia of this species are described and illustrated, as are those of *Capis curvata* Grote, 1882.

Résumé—Nous décrivons du Québec (Canada) *Capis archaia* sp. nov., une nouvelle espèce de Noctuidae (Lepidoptera). Cette espèce fait partie des Noctuidae trifidae dans la sous-famille des Eustrotiinae dans le genre *Capis* Grote, 1882. Nous décrivons et illustrons les adultes et les pièces génitales mâle et femelle de cette espèce ainsi que de *Capis curvata* Grote, 1882.

Introduction

The first specimens of an unknown species of Noctuidae were collected at Saint-Mathieu-de-Beloeil, a charming town approximately 25 km east of Montréal, Québec, on the south shore of the St. Lawrence River. This area is dominated by open farmland and other disturbed habitats where the noctuid fauna includes an abundance of introduced Eurasian species (e.g., *Rhizedra lutosa* (Hübner, 1803), *Apamea unanimitis* (Hübner, 1813), *Lateroligia ophiogramma* (Esper, 1794)). The introductions of these Eurasian species were discussed by Mikkola and Lafontaine (1994) and Handfield (1999); the genus *Lateroligia* Zilli, Fibiger and Ronkay was recently proposed for the latter species (Zilli *et al.* 2005). Surprisingly, the new species was not recorded before 2002 even though southern Québec has been extensively surveyed since the 1880s by professional and amateur lepidopterists (Winn 1912; Handfield 1999). The species may be associated with a very localized host plant or habitat. More than 35 specimens have now been collected, and examination of these specimens, including the genitalic features of both sexes, demonstrates that they are a new species, but in which subfamily and genus should they be placed? The venation and

genitalia suggest a placement amongst the trifold genera, but the palpi and bare lower frons suggest a placement in the quadrifid Noctuidae, a taxonomic nightmare. Fortunately, to the relief of the authors, the question was answered by molecular data through the Barcode of Life Initiative in which the COI mitochondrial gene sequence of the unknown species was compared with those of other species of Noctuidae. The gene sequence shows that the new species belongs to the trifold Noctuidae in the subfamily Eustrotiinae (*sensu* Fibiger and Lafontaine 2005) and is closely associated with the North American genus *Capis* Grote, a genus with only a single known species, *Capis curvata* Grote (Grote 1882). The new species is described below.

Capis archaia sp. nov.

(Figs. 3, 4, 6, 8)

Type material

Holotype: ♂. Saint-Mathieu-de-Beloeil (45°41'32"N, 73°05'31"W), 4.viii.2004, leg. Daniel Handfield (DH006644) (CNC (Canadian National Collection of Insects, Arachnids, and Nematodes), type No. 23465).

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Paratypes: Saint-Mathieu-de-Beloeil, Québec, 9.viii.2002, 1 ♀ (deposited in CNC); 3.viii.2003, 1 ♀; 7.vii.2004, 1 ♂, 3 ♀ (2 ♀ deposited in CNC); 24.vi.2005, 1 ♂; 25.vi.2005, 2 ♂; 28.vi.2005, 1 ♂, 4 ♀ (1 ♂, 2 ♀ deposited in CNC); 4.vii.2005, 1 ♀ (deposited in CNC); 8.vii.2005, 2 ♂, 1 ♀; 11.vii.2005, 1 ♂, 1 ♀; 14.vii.2005, 1 ♂; 26.vii.2005, 1 ♀; all collected by D. Handfield and in his collection unless otherwise stated.

The following specimens have not been included in the above list of paratypes, their abdomen and even entire body having been destroyed by dermestid beetles (Coleoptera: Dermestidae): Saint-Mathieu-de-Beloeil, Québec, 29.vi.2005, 1 ♂, 4 ♀; 30.vi.2005, 2 ♂, 4 ♀; all collected by L. Handfield and in the collection of D. Handfield.

Type locality

Saint-Mathieu-de-Beloeil, census division of Verchères, Québec, Canada.

Etymology

The Greek name *archaia* refers to the primitive characteristics of this species when compared with other species in the trifold Noctuidae.

Diagnosis

The species is not to be confused with any other species even though it has a herminiine-like form and is closely related to *C. curvata* (Figs. 1, 2, 5, 7), from which it differs in size, abdomen length (both sexes), colour of the wings, and structure of the genitalia. It is primitive in its characters, hence its name. The species shows sexual dimorphism in the colour and shape of the forewing.

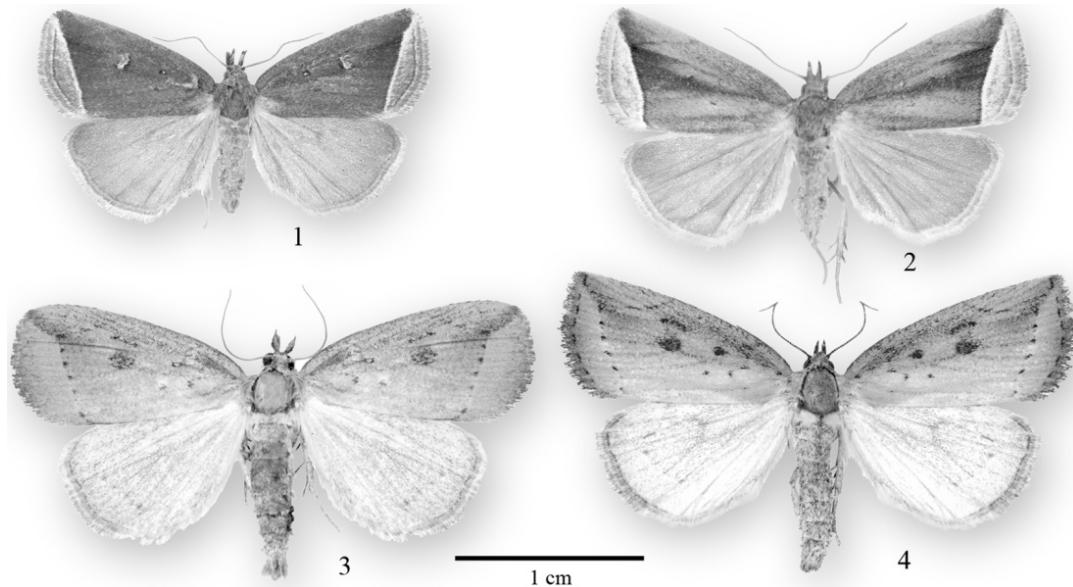
Description

Adult male

Wingspan 25 mm. Head, palpi, protothoracic collar, and thorax concolourous, deep umber brown, fading to a slightly paler brown with age; antennae filiform, ciliate on underside, each segment concolourous with head and palpi but dark brown dorsally; abdomen concolourous with hind wings, with scattered dark grey scales. Forewing deep umber brown, fading to a paler fawn brown with age; scales showing a brilliant hue under light; forewing of male a little more squared apically than that of female, appearing longer and narrower and not as round as that of female; wing veins and reniform,

orbicular, and claviform spots obscure, hardly traceable in fresh specimens, becoming more evident, like those of female, when ground colour fades; antemedian line dark, zigzagged, hardly traceable when present; a vague darker area proximal to postmedian line up to vein M3 then extending towards apex of wing as a dark streak; postmedian line marked by fine black lines (or dots) on veins up to M3 then bending abruptly through a 90° angle near forewing costa; wing margin with small black marks on veins (marks or dots fading to dark umber brown with age); fringe concolourous, not crenate. Hind wing evenly dark brown, but slightly paler than forewing, with a scattering of dark grey scales that define a faint postmedian line and crescentic discal spot; terminal line dark grey, interrupted on veins; fringe dark brown, not crenate. Underside a very light brown, much darker on forewing than on hind wing, with scattered dark grey scales on both wings; veins in both wings protruding; postmedian line hardly traceable; a round discal spot rarely present; fringe slightly darker brown, not crenate, preceded by a darker line interrupted on veins. Male genitalia (Fig. 6): similar to those of *C. curvata* (Fig. 5); valves about 4 times as long as basal width, tapered slightly from base to bluntly pointed apex (valve more conspicuously tapered in *C. curvata*); sacculus on basal third and ventral third of valve with small clavus-like dorsal process subbasally; clasper an elongated, ridge-like bar on middle third of valve; ampulla cylindrical, tapered to bluntly pointed apex (apex slightly clubbed in *C. curvata*), projecting posterodorsally from apical third of clasper and extending beyond dorsal margin of valve; juxta lightly sclerotized, a broad shield-shaped plate; uncus cylindrical, about 0.8 times as long as lateral length of tegumen (uncus about 1.25 times as long as lateral length of tegumen in *C. curvata*), tapered abruptly at apex into downward projecting spine; aedeagus with heavily sclerotized plate on apical half of aedeagus on right with apical process extending to right (aedeagus more lightly sclerotized in *C. curvata* and without apical process on lateral plate); vesica about 1.5 times as long as aedeagus, a simple tube, slightly swollen basally immediately above apex of aedeagus; vesica with heavily sclerotized cornutus subbasally on left with bulbous, striated base and several spines at apex (vesica without cornutus in *C. curvata*).

Figs. 1–4. Adults of *Capis* species: 1, *C. curvata*, ♂, Smoky Falls, Mattagami River, Ontario; 2, *C. curvata*, ♀, Bobcaygeon, Ontario; 3, *C. archaia*, paratype ♂, Saint-Mathieu-de-Beloeil, Québec; 4, *C. archaia*, paratype ♀, Saint-Mathieu-de-Beloeil, Québec.

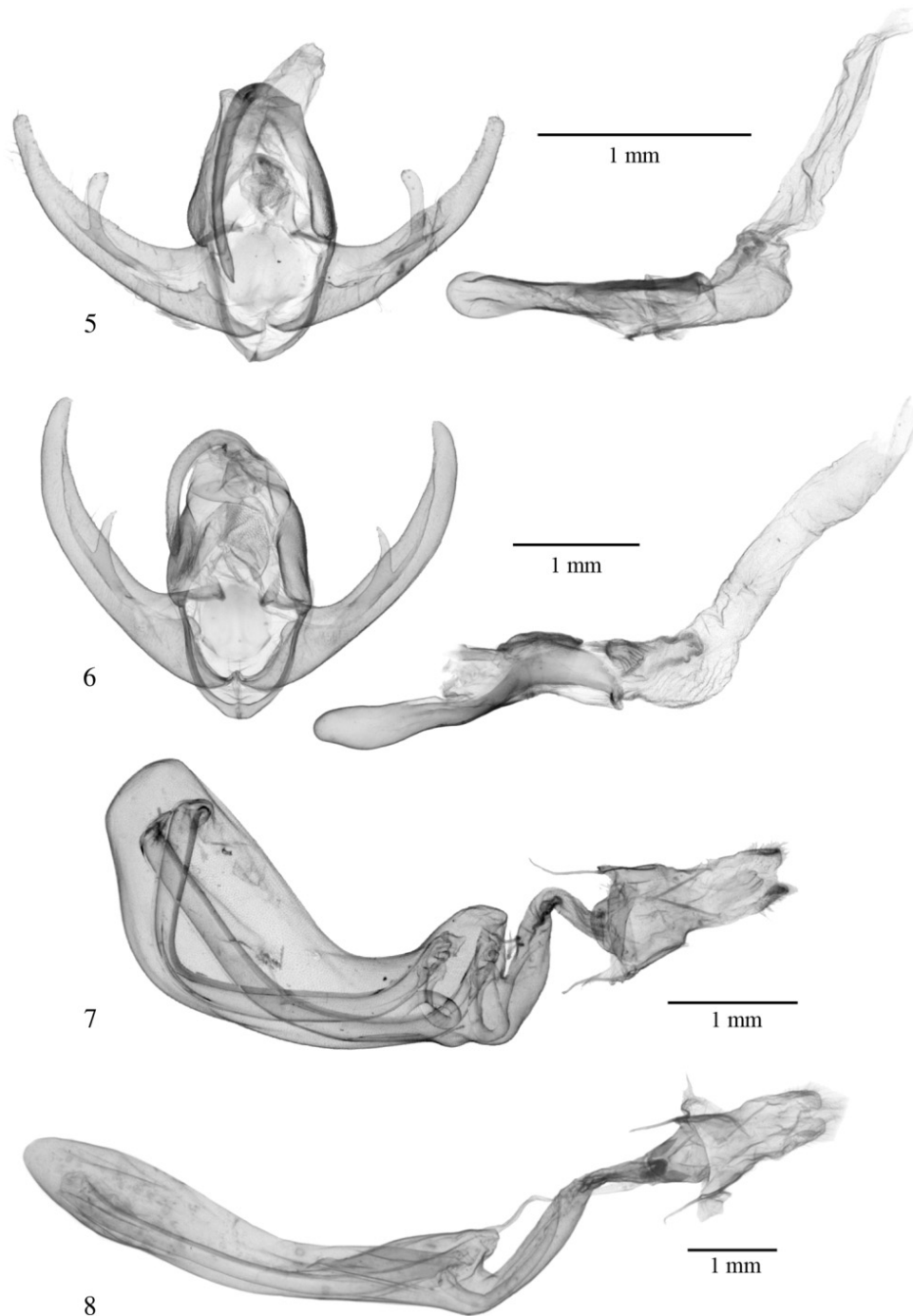


Female

Wingspan 29–30 mm. Head, palpi, prothoracic collar, and thorax concolourous, light fawn brown, darkening slightly with age; antennae filiform, thinner than those of male, sparsely ciliate ventrally, each segment concolourous with head and palpi, darker brown dorsally than ventrally; abdomen long, concolourous with hind wings, with sparse, dark grey scales. Forewing light fawn, darkening slightly with age; scales showing a brilliant hue under light; shape of forewing a little rounder than in male, appearing shorter and broader; veins deep umber brown; reniform spot divided by dark line, more or less traceable, extending from wing base to postmedian line; top of reniform spot round, margined with blackish grey line; inner shading of reniform spot white with a second row of blackish grey scales; base of reniform spot also round but covered with blackish scales; orbicular spot a small, round, white spot surrounded by blackish grey scales; claviform spot faint, slightly darker than forewing; antemedian line dark, zigzagged, barely traceable when present; a vague dark area before postmedian line extending to vein M3 then projecting as a dark streak to apex; postmedian line marked by fine, dark umber brown lines (or dots) on veins up to M3 then turning at 90° angle to costa, also with small, dark umber brown

marks on veins; fringe concolourous, not crenate. Hind wing evenly pale fawn, paler than forewings and with scattered dark grey scales; postmedian line and crescentic discal spot barely traceable; terminal line darker, interrupted on veins; fringe dark brown, not crenate. Underside very light brown, much darker on forewing than on hind wing, with scattered dark grey scales in both wings; veins in both wings protruding; postmedian line and round discal spot barely traceable; discal round spot, when present, marked with dark grey scales; fringes slightly darker brown, not crenate, preceded by a darker line interrupted on veins. Female genitalia (Fig. 8): similar to those of *C. curvata* (Fig. 7) in most details, differing mainly in size and shape of corpus bursae and ostium bursae; corpus bursae long and narrow, about 6 times as long as maximum width (about 3 times as long as wide in *C. curvata* and enlarged anteriorly and posteriorly); ductus bursae about 0.5 times as long as corpus bursae and slightly C-shaped; ostium bursae a sclerotized, U-shaped pouch about as long as wide (0.5 times as long as wide in *C. curvata*); anterior and posterior apophyses slightly longer than lateral width of abdominal segment eight; posterior apophyses expanded posteriorly into a broad plate near anal papillae; anal papillae lightly sclerotized, densely setose.

Figs. 5–8. Genitalia of *Capis* species: 5, *C. curvata*, ♂ genitalia; 6, *C. archaia*, ♂ genitalia; 7, *C. curvata*, ♀ genitalia; 8, *C. archaia*, ♀ genitalia.



Biology and habitat

Unknown. The larvae likely feed on leaves or stems, as do other members of Eustrotiinae in North America for which the host plants are

known, and are probably associated with humid or boggy habitats (Smith 1895; Poole 1989; Handfield 1999). The species is univoltine and hibernates as young larvae. The small eggs are

medium green, unmarked, round, and take about 10 days to hatch. The peak of the flight season is the last week of June and the first 2 weeks of July. The moth flies late, between 2300 and 0030, with peaks between 2330 and 2400 (EDT), and usually lands very low on an illuminated sheet.

Remarks

This species was first collected at Saint-Mathieu-de-Beloeil, County of Verchères, Québec, Canada, at the home of the author (D. Handfield), on 9 August 2002, and since then additional specimens have been collected each year. Both sexes come readily to light (mercury vapour and incandescent lamps). Since the species was collected in a disturbed area consisting of a housing complex in open farmland, it was first thought to be a European or Asian introduction; however, a thorough search of the noctuid fauna of Eurasia (Europe, China, Japan, *etc.*) yielded no similar species. Images of the species were sent to experts in Eurasia and the United States (see Acknowledgements), but no one was able to suggest an identity for the unknown species. The placement in the genus *Capis*, a genus unknown outside North America, has convinced the authors that the species is most probably native to eastern North America. There is still a slight possibility that it could be an introduction from another country where it remains unknown. The only other species known in the genus *Capis* (*C. curvata*) is also restricted to eastern North America (Rockburne and Lafontaine 1976; Handfield 1999). It remains a mystery why this apparently indigenous North American species has not been previously found.

Distribution

Only 37 specimens of *C. archaia* are now known: 35 from the type locality (Saint-Mathieu-de-Beloeil) and 2 others recently found: one in the collection of Julien Delisle, collected 7 July 2002 in the sphagnum bog at Lanoraie, Québec (45 km north of the type locality), and one in the collection of Tommy Thouin, collected 7 July 2004 at Joliette, Québec (52 km north of the type locality), also in a disturbed area. Both additional localities are on the north shore of the St. Lawrence River. If the species is indigenous to North America, as it seems to be, it is most likely not restricted to Québec and should be sought in neighbouring provinces and states. Until the distribution and

preferred habitat of the species are better known, there will always be some doubt about its true origin.

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