

# Ebony Jewelwing, Black-Winged Damselfly (suggested common names) *Calopteryx maculata* (Beauvois, 1807) (Insecta: Odonata: Calopterygidae)<sup>1</sup>

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## Introduction

*Calopteryx maculata* (Beauvois), the ebony jewelwing, is a large damselfly in the family Calopterygidae that is endemic to eastern North America. The ebony jewelwing has an iridescent green body with dark wings (Figures 1–3). Wings of the male ebony jewelwing are completely black, while wings of the female are smoky bronze with a distinct white spot (pterostigma) at the outer edge of the forewing (Figure 4). The combination of iridescent green body and dark wings distinguish this species from all other damselflies in the family Calopterygidae, and from other damselflies in North America. The ebony jewelwing is not listed as a species of concern.



Figure 1. Male ebony jewelwing, *Calopteryx maculata* (Beauvois), resting on a leaf (lateral view).

Credits: Alfred Runkel, UF/IFAS Florida Medical Entomology Laboratory



Figure 2. Male ebony jewelwing, *Calopteryx maculata* (Beauvois), resting on a leaf (lateral view).

Credits: Nathan Burkett-Cadena, UF/IFAS Florida Medical Entomology Laboratory

## Synonymy

*Agrion maculatum* (Beauvois 1805)

*Agrion virginica* (Westwood 1837)

*Calopteryx virginica* (Westwood 1837)

*Calopteryx holosericea* (Burmeister 1839)

*Calopteryx opaca* (Say 1839)

1. This document is EENY-693, one of a series of the Department of Entomology and Nematology, UF/IFAS Extension. Original publication date November 2017. Visit the EDIS website at <http://edis.ifas.ufl.edu>.

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*Calopteryx materna* (Say 1839)

*Calopteryx papilionacea* (Rambur 1842)

*Calopteryx floridana* (Huggins 1927)

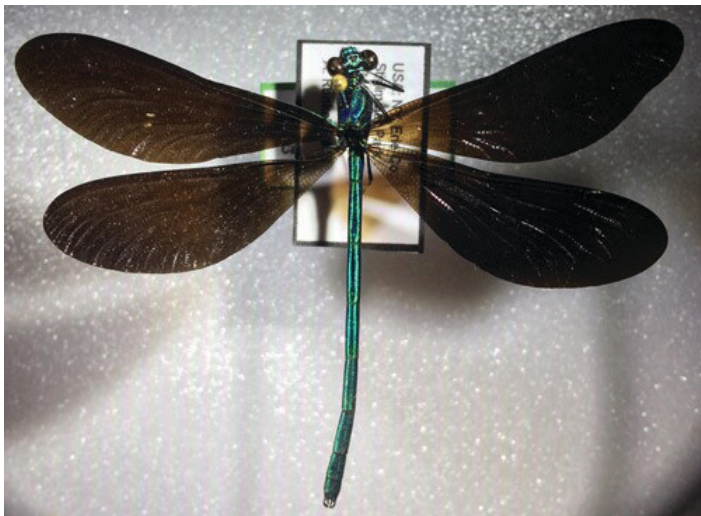


Figure 3. Pinned male ebony jewelwing, *Calopteryx maculata* (Beauvois).

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Figure 4. Pinned female ebony jewelwing, *Calopteryx maculata* (Beauvois) (dorsal view).

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## Distribution

The ebony jewelwing is found throughout most of eastern North America. Its range extends from Canada in the north to Florida in the south and as far west as Wisconsin and Texas (Hassall 2015). In Florida, this damselfly occurs further south on the Gulf Coast (DeSoto County) than the Atlantic Coast (Brevard County) (Figure 5). Adults are typically encountered around shaded freshwater streams with dense vegetation; however, males may occasionally leave these areas to seek new territory (Waage 1972). The

ebony jewelwing can often be found resting on leaves or branches in sunny spots of the forest.



Figure 5. Geographic range of the ebony jewelwing, *Calopteryx maculata* (Beauvois), in the United States.

Credits: d-maps.com, range from odonatacentral.org and Hassall (2015), edited by Alfred Runkel, UF/IFAS Florida Medical Entomology Laboratory

## Description

Adult male ebony jewelwings are fairly large, with a body length of 39–57 mm (approximately 2.25–3 inches) and a wingspan of 58–76 mm (approximately 1.5–2.25 inches). The body is iridescent dark green, but depending on the light may appear blue, blue-green, or even black. The wings are dark throughout, as a result of the dense network of thick, dark veins and the smoky color of the membrane itself. This species, along with *Argia fumipennis* Burmeister and *Hetaerina titia* Drury, are the only damselflies in North America with all-black wings. Recently eclosed adults (emerged from the final molt) tend to have wings that are more brown than black (Waage 1972).

Adult female ebony jewelwings are bluish-green, but lack the brilliant iridescence of the male body (Figures 1–3). Wings are more translucent, appearing light to dark brown rather than black. The wings of the female have a distinct white spot near the wingtip (the pterostigma, Figure 6),



which makes it easy to distinguish females from males (Ballou 1984).

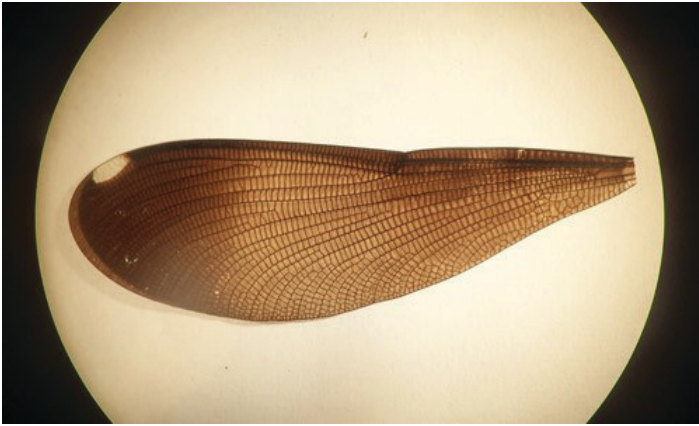


Figure 6. The wing of a female ebony jewelwing, *Calopteryx maculata* (Beauvois). The pterostigma is seen on the top left tip of the wing. Credits: Eric Blosser, UF/IFAS Florida Medical Entomology Laboratory

While at rest, the ebony jewelwing holds its wings pressed together, vertically, above the thorax, a resting posture shared by most damselflies (Bick and Bick 1977).

## Life Cycle

The cylindrical eggs of the ebony jewelwing are laid in slow moving streams and rivers where the aquatic and predaceous immatures, known as naiads (juveniles), hatch and then hunt for small aquatic prey, including aquatic insects, worms, and small fish. Naiads are olive green to brown in color. Three caudal gills that project from the base of the abdomen regulate oxygen exchange as well as aid in directional swimming (Capinera 2016) (Figure 7). As with the adults, naiads of ebony jewelwings are diurnal and obligate carnivores. To capture prey, they rapidly extend their long, prehensile lower lip (labium) and seize their prey (Capinera 2016).



Figure 7. Ebony jewelwing, *Calopteryx maculata* (Beauvois), naiad (dorsal view).

Credits: John and Kendra Abbott, Abbott Nature

Damselfly naiads are important prey for many animals, such as fish, birds, and frogs, as well as a variety of aquatic invertebrates (Hussain and Ahmed 2003). Adults are preyed upon by dragonflies, birds, fish, spiders, and frogs (Waage 1972). Naiads undergo 11–12 molts in a single year (Martin 1939), then crawl out of the water onto nearby vegetation to molt a final time into a winged adult, with sexual maturity developing a few days later (Nevin 1929).

## Mating Behavior

Adult males are territorial and compete with one another for high-quality breeding sites around slow moving vegetated streams and rivers. Males attempt to attract females by performing a “cross” display (Figure 8). This display is performed by facing the female and turning the hindwings downward while keeping them perpendicular to the body, then raising the forewings and abdomen, revealing a pale area on the underside of the abdomen.

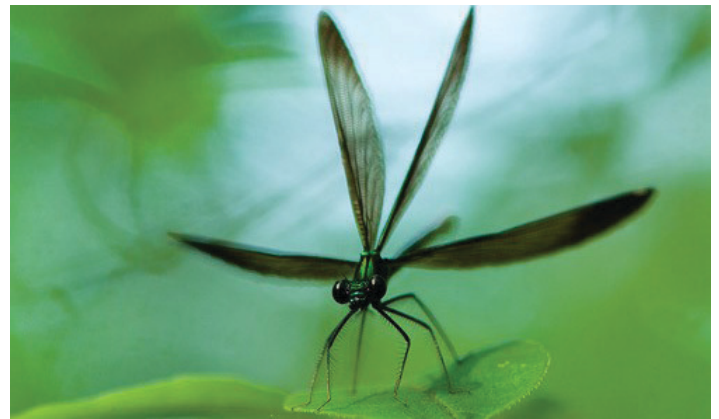


Figure 8. Male ebony jewelwing, *Calopteryx maculata* (Beauvois), performing the “cross” display.

Credits: Clay Bolt, Clay Bolt Nature Photography

Having successfully attracted a female, the male begins his fluttering courtship, which involves whirling his wings and hovering in front of her, followed by walking down her wings to assume his position for copulation (Alcock 1979). When the female accepts the male, the male grasps her prothorax with the copulatory appendages at the end of his abdomen and she responds by raising the tip of her abdomen to the underside of his abdomen (Capinera 2016) (Figure 9 A–E). This heart-shaped arrangement during copulation is known as a mating wheel. The male is equipped with a specialized secondary penis on the underside of his abdomen, which accepts sperm from the primary penis on the tip of the abdomen and is then used to transfer his sperm to the female’s spermatheca (sperm storage organ). The penis also contains small, brush-like structures, which are used by the male to remove sperm in the spermatheca deposited by previous mates, thereby reducing competition with other males (Waage 1979).

On average, ebony jewelwings copulate for three hours, although this time can range from one to six hours (Roughgarden 2004).



Figure 9. A) Male ebony jewelwing, *Calopteryx maculata* (Beauvois), resting; B) Female ebony jewelwing resting; C) Male ebony jewelwing performing his fluttering courtship for a female; D) Male and female ebony jewelwings during copulation; E) Female ebony jewelwing laying eggs.

Credits: Matthew Bolek, Oklahoma State University

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