

SCIENTIFIC NOTE

THE DISTRIBUTION OF *GNORIMELLA MACULOSA* (KNOCH) (COLEOPTERA: SCARABAEIDAE: CETONIINAE) IN NORTH AMERICA

Gnorimella maculosa (Knoch, 1801) is a medium-sized (12–14 mm) scarab beetle in the subfamily Cetoniinae and is found in eastern North America. It is a distinctive species with the pronotum and venter densely clothed with long, rufous pubescence. In typical specimens, the elytra are castaneous with scattered, irregular dark maculations, and the pronotum is dark with scattered yellowish maculations. The exposed pygidium is brilliant yellow in females and has a broad, U-shaped, black marking along the ventral margin; in males the pygidium is largely dark with three median and lateral yellow spots. There is considerable variation in coloration, however, and some specimens (particularly males) are significantly darker overall, with darker and more extensive elytral maculation and the pygidium almost entirely dark (Hicks 1960).

Larvae feed in decomposing wood and have been recorded from *Cercis canadensis* L. (eastern redbud, Fabaceae) (Ritcher 1945). Adults are frequently collected nectaring on flowers, and have been found on *Rubus* spp. (raspberry, Rosaceae), *Viburnum acerifolium* L. (maple-leaf viburnum, Caprifoliaceae), *Cornus rugosa* Lam. (round-leaved dogwood, Cornaceae), *Crataegus* spp. (hawthorn, Rosaceae), *Pyrus* spp. (apple, Rosaceae), *Rhus* spp. (sumac, Anacardiaceae), *Liriodendron tulipifera* L. (tulip tree, Magnoliaceae), *Acer rubrum* L. (red maple, Aceraceae), *C. canadensis*, and *Physocarpus opulifolius* (L.) (ninebark, Rosaceae) (Knoch 1801; Casey 1915; Frost 1932; Chagnon 1936; Hicks 1957, 1960; Howden 1968; Staines 1986; Kiska and Young 2002). *Gnorimella maculosa* frequents wooded areas and is a strong flier (Staines 1989).

Gnorimella maculosa has been considered a rare beetle throughout its range (Hicks 1957, 1960), and Howden (1968) wrote that adults were “never abundant”. Staines (1989), however, concluded that “This species may not be as rare as is indicated from collections.” In North America, *G. maculosa* has been reported from Ontario (Kirby 1827; Hicks 1957, 1960) and Québec (Chagnon 1936; Hicks 1957, 1960) in Canada, and from Alabama (Downie and Arnett 1996; Arnett 2000), Connecticut (Britton 1920; Leng 1920), Florida (Leng 1920), Georgia (Howden 1968; Arnett 2000), Indiana (Blatchley 1910; Casey 1915), Iowa (Howden 1968), Kentucky (Arnett 2000), Louisiana (Riley and Wolfe 2003), Maryland (Staines 1986, 1989), Missouri (Downie and Arnett 1996), New Hampshire (Frost 1932),

New Jersey (Hicks 1960), New York (Downie and Arnett 1996), North Carolina (Howden 1968; Arnett 2000), Ohio (Blatchley 1910), Pennsylvania (Casey 1915; Leng 1920), Rhode Island (Davis 1904; Sikes 2004; Sikes and Webster 2005), South Carolina (Arnett 2000; Harpootlian 2001), Tennessee (Arnett 2000), Texas (Riley and Wolfe 2003), Virginia (Casey 1915; Leng 1920; Arnett 2000), West Virginia (Arnett 2000), and Wisconsin (Kiska and Young 2002) in the United States.

A literature review was conducted to compile published records of *G. maculosa*. Additionally, a variety of collections and online databases were checked, and individual collectors and museum curators (listed below) were consulted to obtain information on unpublished records and recently collected specimens. On this basis, a revised distribution of the species was compiled. Acronyms of collections referred to are:

- CGMC** Christopher G. Majka Collection, Halifax, NS, Canada
- DBDM** David Bourque-Dana Michaud Collection, Winslow, ME, USA
- EGRC** Edward Riley Collection, College Station, TX, USA
- TAMU** Texas A&M University Collection, College Station, TX, USA
- UMMZ** University of Michigan Collection, Museum of Zoology, Ann Arbor, MI, USA
- USNM** National Museum of Natural History, Washington, D.C., USA

The present study newly records *G. maculosa* from the District of Columbia, Kansas, Maine, Massachusetts, Michigan, and Nova Scotia. Although Leng (1920) listed Florida as part of the range of *G. maculosa*, there are no published records of this species from the state (Howden 1968; Peck and Thomas 1998). Consequently, the record given below establishes the presence of this species there. Additionally, while Riley and Wolfe (2003) reported that the species had been collected in Louisiana, they did not provide a specimen record. Consequently, this information is provided below.

CANADA: Nova Scotia: Annapolis County: Annapolis Royal (44.74196°N; 65.51614°W), 30 June 2002, Sheilagh Hunt and Christopher G. Majka (1 female, CGMC). **UNITED STATES:**

District of Columbia: Washington, 4 May 1907, Condit (1, USNM); Washington, 1886, E. Shoemaker (1, USNM); Washington, 5 May 1918, collector not recorded (1, USNM); Washington, 1 May 1915, J. D. Hood (1, USNM); 11 May 1922, L.L. Buchanan (1, USNM); Washington, 10 May 1904, F. Knab

(1, USNM); Rock Creek, 30 April 1905, collector not recorded (1, USNM). **Florida:** Levy County: Cedar Keys, June, S. Hubbard (1, USNM). **Kansas:** Johnson County: near Zarah, 27 April 1991, R. L. Huber (2, TAMU). **Louisiana:** West Feliciana Parish, [no date available], Edward Riley (1, EGRC). **Maine:**

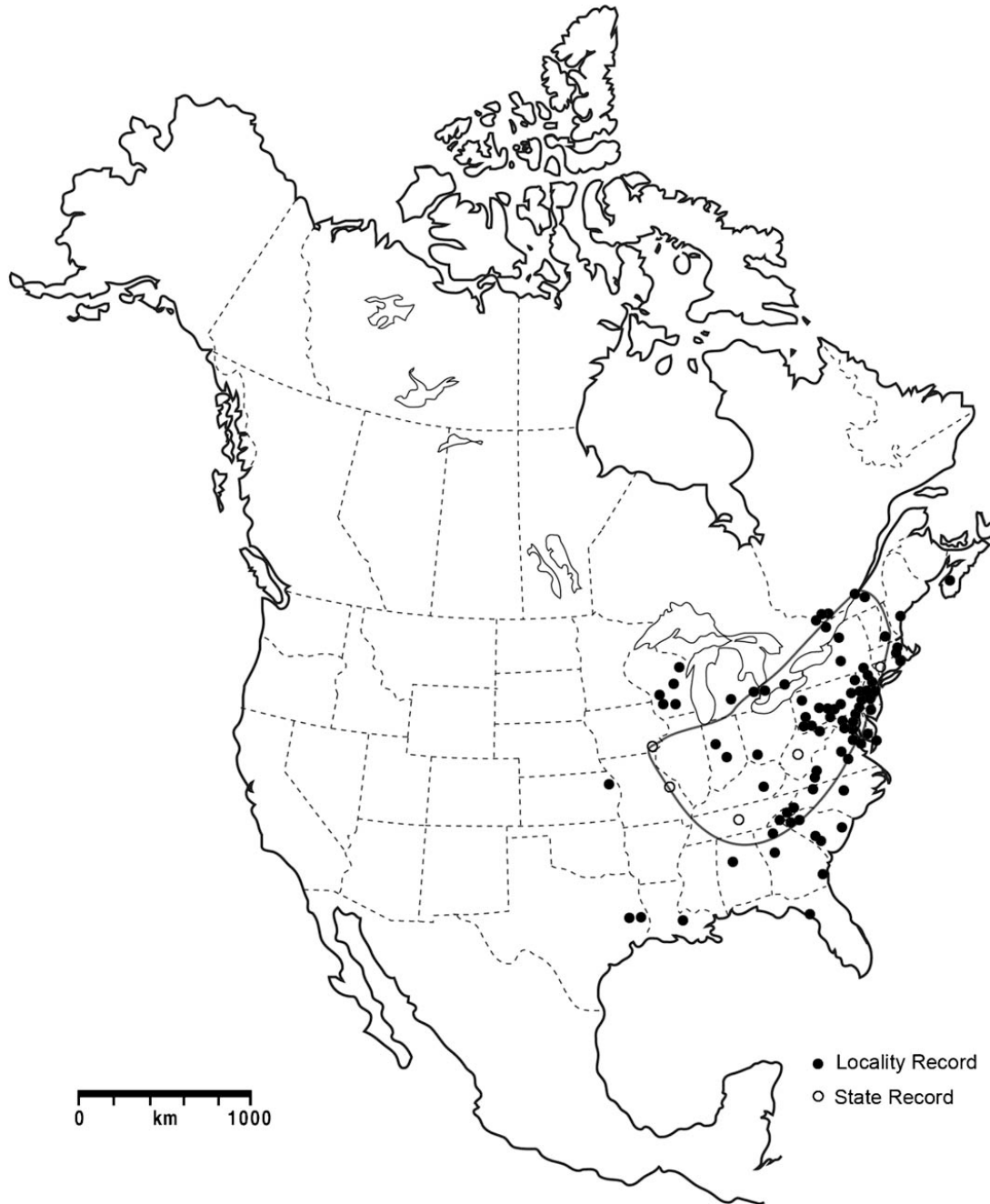


Fig. 1. Distribution of *Gnorimella maculosa* in North America. The bounded elliptical area is the range as indicated by Howden (1968). Solid circles indicate a specific locality record; open circles indicate a state record for which no specific locality is available.

Cumberland County: Portland, 26 June 2007, bark beetle survey (1, DBDM); Portland, 18 June 2009, bark beetle survey, (1, DBDM). **Massachusetts:** Middlesex County: Framingham, 13 June 2008, Jennifer Forman Orth, (available from: bugguide.net/node/view/190843/bgimage. accessed on 13 July 2010); Norfolk County, West Medway, 29 May 1955, E. A. Chapin (1, USNM). **Michigan:** Ingham County, 20 July 1933, Will Irwin (1, UMMZ); St. Clair County: Port Huron, date not recorded, S. Hubbard (1, USNM).

The distribution of *G. maculosa* is shown in Fig. 1. The bounded elliptical area is the range of the species as indicated by Howden (1968). The present compilation of records indicates that it occurs in all the jurisdictions included within this area with the possible exception of Delaware, Illinois, and Vermont – states for which I have not been able to find records.

It is evident that *G. maculosa* occurs more widely in eastern North America than indicated by Howden (1968). The range extends further to the northeast and east (Annapolis Royal, NS: 44.74°N; 65.51°W), the southeast (Yauhannah, SC: 33.63°N; 79.19°W), the south (Cedar Keys, FL: 29.16°N; 83.05°W), the southwest (Lufkin, TX: 31.34°N; 94.72°W), the west (Zarah, KS: 39.00°N; 94.82°W), and the northwest (Jackson County, WI: 44.32°N; 90.83°W). These range extensions are considerable. Annapolis Royal, NS is 560 km northeast, Yauhannah, SC is 350 km southeast, Cedar Keys, FL is 600 km south, Lufkin TX is 900 km southwest, Zarah KS is 350 km west, and Jackson WI is 400 km north of the previously recorded range of the species. The presently known range encompasses a substantial portion of the eastern United States and adjacent areas of southern Canada. Whether or not this range is entirely contiguous or whether populations in Nova Scotia in the northeast (similar to other beetles discussed by Majka *et al.* 2009), and Texas and Louisiana in the southwest may be disjunct from the balance of the population requires further investigation.

Is *G. maculosa* actually rare, or is it simply an infrequently collected species? Making such a determination is not always simple. It is certainly clear that *G. maculosa* occurs much more widely than hitherto supposed. Its developmental biometrics are still imperfectly known, and depending on its microhabitat requirements – for instance, if it is restricted to certain tree species hosts or is found only in relatively undisturbed or old growth situations – it could legitimately be rare, and hence potentially vulnerable to disturbance. Hicks (1957, 1960) believed that *G. maculosa* could be abundant in a restricted local area. The site in Wakefield, Québec where he collected several specimens was steep, rugged, and undisturbed, had ample decaying forest debris and an abundant supply of flowering plants, particularly *C. rugosa*, which attracted adults.

Clearly, further research is warranted to better understand the biology, distribution, and abundance of this prominent member of our scarab beetle fauna.

Sincere thanks to David Bourque (Winslow, Maine), James Boone (Field Museum of Natural History), Janet Ciegler (West Columbia, South Carolina), Patrick Coin (Durham, North Carolina), Phillip Harpootlian (Clemson University), Ronald Huber (Bloomington, Minnesota), William Hull (Cincinnati, Ohio), Dana Michaud (Waterville, Maine), Mark O'Brien (University of Michigan), Jennifer Forman Orth (Framingham, Massachusetts), M. J. Paulsen (University of Nebraska State Museum), Brett Ratcliffe (University of Nebraska), Edward Riley (Texas A&M University), and Charles Staines (Smithsonian Institution) for generously providing specimen records and other information that contributed to this study. Many thanks to Sheilagh Hunt for helping me to discover *G. maculosa* in Nova Scotia. This work was assisted by the Board of Governors of the Nova Scotia Museum.

REFERENCES CITED

- Arnett, R. H., Jr. 2000.** American Insects: A Handbook of the Insects of America North of Mexico. CRC Press, Boca Raton, FL.
- Blatchley, W. S. 1910.** Coleoptera or Beetles (exclusive of the Rhynchophora) Known to Occur in Indiana with Bibliography and Description of New Species. Nature Publishing Company, Indianapolis, IN.
- Britton, W. E. 1920.** Check-list of the Insects of Connecticut. Connecticut State Geological and Natural History Survey, Hartford, CT.
- Casey, T. L. 1915.** A review of the American species of Rutelinae, Dynastinae and Cetoniinae. *Memoirs of the Coleoptera* 6: 1–394.
- Chagnon, G. 1936.** Contribution à l'étude des coléoptères de la province de Québec. (suite). *Le Naturaliste Canadien* 63: 104–112.
- Davis, C. A. 1904.** Instructions for collecting and mounting insects; also a checklist of the Coleoptera of the state of Rhode Island, USA. Third edition. *Bulletin of the Roger Williams Park Museum* 1: 1–47.
- Downie, N. M., and R. H. Arnett, Jr. 1996.** The Beetles of Northeastern North America. Sandhill Crane Press, Gainesville, FL.
- Frost, C. A. 1932.** An interesting northern record. *Bulletin of the Brooklyn Entomological Society* 27: 188.
- Harpootlian, P. J. 2001.** Scarab Beetles (Coleoptera: Scarabaeidae) of South Carolina. *Biota of South Carolina*, Volume 2. Clemson University, Clemson, SC.
- Hicks, S. D. 1957.** Distribution and occurrence of *Gnorimella maculosa* (Knoch). *The Canadian Field-Naturalist* 71: 199–200.
- Hicks, S. D. 1960.** Canadian specimens of *Gnorimella maculosa* (Knoch) (Scarabaeidae) with notes on variation. *The Coleopterists Bulletin* 14: 91–93.
- Howden, H. F. 1968.** A review of the Trichiinae of North and Central America (Coleoptera: Scarabaeidae). *Memoirs of the Entomological Society of Canada* 54: 1–77.

- Kirby, W. 1827.** Descriptions of some new genera of petalocerous Coleoptera. *Zoological Journal* 3: 145–158.
- Kiska, N. L., and D. K. Young. 2002.** An annotated checklist of Wisconsin Scarabaeoidea (Coleoptera). *Insecta Mundi* 16: 31–48.
- Knoch, A. W. 1801.** *Neue Beiträge zur Insektenkunde.* Schwickertfchen Verlage, Leipzig, Germany.
- Leng, C. W. 1920.** *Catalogue of the Coleoptera of America, north of Mexico.* John D. Sherman, Jr., Mount Vernon, NY.
- Majka, C. G., J.-P. Michaud, G. Moreau, and A. Smetana. 2009.** *Philonthus hepaticus* (Coleoptera: Staphylinidae) in eastern Canada: are distribution gaps distinctive features or collecting artifacts? *In: Biodiversity, Biosystematics, and Ecology of Canadian Coleoptera II.* (C. G. Majka and J. Klimaszewski, editors). *ZooKeys* 22: 347–354. Available from: pensoftonline.net/zookeys/index.php/journal/article/view/208/244 (Accessed on 13 July 2010).
- Peck, S. B., and M. C. Thomas. 1998.** A Distributional Checklist of the Beetles (Coleoptera) of Florida. *Arthropods of Florida and Neighbouring Land Areas*, Volume 16. Florida Department of Agriculture and Consumer Services, Gainesville, FL.
- Riley, E. G., and C. S. Wolfe. 2003.** An annotated checklist of the Scarabaeoidea of Texas (Coleoptera). *Southwestern Entomologist Supplement* 26: 1–37.
- Ritcher, P. O. 1945.** North American Cetoniinae. *Bulletin of the Kentucky Agricultural Experiment Station* 476: 1–39.
- Sikes, D. S. 2004.** The Beetle Fauna of Rhode Island: An Annotated Checklist. Rhode Island Natural History Survey, Volume 3. Kingston, RI.
- Sikes, D. S., and R. P. Webster. 2005.** Bioinventory of Rhode Island Coleoptera: 45 new records. *The Coleopterists Bulletin* 59: 311–327.
- Staines, C. L., Jr. 1986.** An annotated list of the Scarabaeoidea (Coleoptera) of Maryland. *Maryland Entomologist* 3: 67–68.
- Staines, C. L., Jr. 1989.** Observations on *Gnorimella maculosa* (Coleoptera: Scarabaeidae: Cetoniinae). *Maryland Entomologist* 2: 79–89.

Christopher G. Majka, Research Associate, Nova Scotia Museum, 1747 Summer Street, Halifax, Nova Scotia, CANADA, B3H 2G5, c.Majka@ns.sympatico.ca

(Received 19 July 2010; accepted 20 September 2010. Publication date 20 December 2010.)