A REVIEW OF THE GENUS *MALLADA*
IN THE UNITED STATES AND CANADA,
WITH A NEW SPECIES (NEUROPTERA: CHRYSOPIDAE)

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Analysis of the Canadian chrysopid fauna (Garland, 1981) revealed an undescribed species of *Mallada* ranging into southern Ontario. Accordingly, a draft description and illustrations were transmitted to the senior author. As few of our species have been given modern redescriptions, it is appropriate to review the status of all four known members of this genus from the U.S. and Canada.

The taxonomic status of *Mallada* was discussed by Adams 1975, and a detailed treatment of genitalic morphology given by Principi 1977. The genus is characterized by: left mandible toothed, inner gradate crossvein of forewing ending in a branch of radial sector, not on pseudomedia (Fig. 20); pseudomedia not comprising any crossveins; micropoculae or cuticular glands present on male pronotum, microtholi absent, tignum and gonapsis present, arcessus normal; ectoprocts and hypovalva (eighth and ninth sternites) without unusual projections, larva trash-carrying and overwintering (Séméria, 1977).

*Mallada* is primarily an Old World genus, constituting a major part of the chrysopid fauna of Europe, Africa, India, Southeast Asia, and Australia. Although New 1980 does not subdivide the Australian “Chrysopa” into genera, or species groups, it is possible tentatively to assign species on data given; 15 of the 47 species of Chrysopinae fall into *Mallada*. Tjeder 1966 points out that 19 of the 39 African “chrysopas” (Saurius + Glenochrysa + Chrysoperla + Brinckochrysa + Apertocharysa + Anisochrysa) are assignable to Anisochrysa (i.e., *Mallada*), and places 22 additional Old World species in that taxon. Aspöck et al. 1980 list 15 European *Mallada* species (as Anisochrysa). In the New World, there are only 5 known species, *M. (Triadochrysa) triangularis* Adams 1978 from Mexico, and the other North American species discussed below.

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**Mallada macleodi** sp. nov.

**DESCRIPTION.** Head narrow, pale green, eyes large, antennae unmarked; genae with a shiny narrow black band from margin of eye, extending to anterior lateral edges of clypeus; labrum black posterolaterally, green medially (Fig. 3); palpi blackish throughout; frons raised anteriorly; face with scattered setae, some longer anteriorly on clypeus.

Thorax pale green, pronotum with two anterolateral brown patches; setae whitish. Legs green, pretarsal claws deeply excised.

Abdomen green, setation normal, microtholi absent.

Male terminalia (Fig. 2). Sternites VIII+IX fused, elongate; dorsal apodeme long, prominent; ventral apodeme absent. Genitalia (Fig. 1) with broad transverse tignum; gonarcus expanded laterally, rectangular dorsally; entoprocessus prominent, expanded ventromedially; aecessus broadly continuous with dorsum of gonarcus, sclerotised proximally, produced caudad and slightly down-curved, apex bluntly pointed; gonosaccus rudimentary, with only a few small straight gonosetae positioned between the ventromedial expansions of the entoprocessus; gonapsis (Figs. 9, 10) three-pronged, with lateral wings narrow, the caudal process dorsoventrally expansive proximally and tapering as an acuminate downcurved hook, broad internal saccus terminates in a vertical lobe; gonocristae sparse and only minutely developed on hypovalva.

Female terminalia. Subgenitale membranous proximally, with many microthecae; apical lobe notched; transverse callus prominent, with an ental excavation but not a cavity. Spermatheca (Fig. 4) pillbox-shaped; vela tubular, conspicuously bent toward spermathecal bulb.

Wings. Pterostigmata prominently marked, brownish. Venation narrowly margined with brownish amber, especially in forewing, gradates of forewing dark, of hind wing amber. Many crossoveins of forewing dark; costals all dark, male with 19 (22.7) 26, female with

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Fig. 1–4, *Mallada macleodi*: 1, dorsal aspect of male genitalia (Ontario); 2, same, terminalia with structures everted; 3, labrum and mandibles, female, Ontario; 4, same as 3, spermatheca. Fig. 5–8. *Mallada perfectus*: 5, dorsal aspect of genitalia; British Columbia; 6, same as 5, male terminalia with structures everted; 7, labrum and mandibles, female, British Columbia; 8, same as 7, spermatheca. Scale is for genitalia and spermatheca.
21 (24.2) 26 (mean in parentheses). Inner gradate series of forewing normal for the genus, terminating on a branch of the radial sector (Fig. 20). Forewing length: male 10.0 (11.5) 12.5, n=10; female 12.0 (13.0) 13.7, n=10 (mm, mean in parentheses). TYPE MATERIAL. Holotype: TEXAS, Erath Co.: Stephenville, 20. iv.1981, 3, C. W. Agnew (MCZ No. 32576).


REMARKS. The specific epithet recognized Ellis G. MacLeod, who many years ago collected material of this species, pointed out its existence to the senior author, and generously presented material for study. This species is easily separable from luctuosus and sierra by its lack of black pronotal markings, but is easily confused with perfectus, which differs in having an entirely black labrum, usually fewer and paler costal crossveins, and more prominently brown-bordered venation. It is safest to verify identifications by genitalic dissection.
Fig. 9–10. Mallada macleodi: gonapsis, lateral and dorsal views, Texas. Fig. 11–12, M. perfectus: gonapsis, lateral and posterovertral views, Shasta Co., Calif. 13–14, M. sierra: gonapsis dorsal, head and thorax, dorsal; Fig. 15–19, M. luctuosus: 15–16, gonapsis, ventral and lateral views; 17, spermatheca; 18, head and thorax, dorsal; 19, gonapsis and accessus, ventral. Fig. 20, M. macleodi, venation of male forewing, Ontario, showing inner gradate vein ending on a branch of radial sector (and an extra crossvein, in the last gradate cell, a not-uncommon condition).
The new species clearly was the insect which the late Dr. R. C. Smith studied from Manhattan, Kansas (Smith 1922, as *Chrysopa cockerelli*). His immatures were debris carriers and overwintered as larvae, confirming the generic assignment. Smith found adults in June (CNC), others in August in association with willows; he deserves credit for observing that the “black lines to mouth not connecting, though the labrum is light brown” (Smith *op. cit.*: 1367, including Fig. 163). Consequently, we have a fairly complete description of the immature stages of the new species, and it is the only Nearctic representative of *Mallada* to have been studied in such detail.

On present evidence, the new species occupies the central part of the continent, ranging into Canada in southern Ontario and coming into contact with the more western *M. perfectus* in Arizona and New Mexico.

*Mallada perfectus* (Banks 1895)

*Chrysopa perfecta* Banks 1895: 516–517. Holotype ♀ MCZ No. 11914, El Taste, Baja Calif.

*Chrysopa cockerelli* Banks 1903: 154–155, new synonymy. Holotype ♀ MCZ No. 11375, East Las Vegas, N. M.

*Chrysopa marginalis* Banks 1906a:5 (not *C. marginalis* Navás 1905).


**DESCRIPTION.** Genal stripe black, labrum (Fig. 7) wholly black, palpi black, antennae pale. Body light green with no middorsal stripe, pronotum with two cinnamon-brown patches. Wings with costal veinlets black at ends, pale in 'middle, 8 costal veinlets: 16–(18.7)–21, N=10; ♀: 18–(20.3)–22, N=10 (mean in parentheses); transverse veins conspicuously brown-bordered.

Male terminalia. Apodeme of ninth tergite articulates on short apodeme of sternites 8+9 (Fig. 6), arcessus (Fig. 5) short, broad, with lateral subapical projections; gonapsis (Fig. 11–12) with spatulate emergent process, well-developed arms and simple internal bulb. Gonocristae small, but larger than in *M. macleodi*.

Female. Spermatheca with broad-based usually short erect vela.

**DISTRIBUTION.** Calif., Ore., Wash., British Columbia, Wyoming, Utah, Colo., Ariz., N.M., Baja Calif.
REMARKS. This species occurs throughout the Western United States, but is commonest in the Southwest. The short mediuncus and spatulate process of the gonapsis readily distinguish the males from those of *M. macleodi*, and the females are identifiable by the broad-based erect vela. Some Arizona specimens have the vela nearly as elongate as that of *macleodi*, but never curved.

*Mallada sierra* (Banks) **new combination**

*Chrysopa sierra* Banks 1924:431.

DESCRIPTION. This species is structurally and colorationally like *M. perfectus*, except for the following: pronotum with 2 black spots each surrounded by a patch of cinnamon brown (Fig. 14). Mesoprescutum with 2 black spots. Wings with black spot at base of costal area; forewing with black spot at intersection of 2A2 and 3A. Crossveins darker than in *perfectus*, and brown-bordering of veins less pronounced. Gonapsis (Fig. 13) with chisel-shaped reduced medial process and reduced bulb. Gonocristae less developed than in *perfectus*.


REMARKS. This species is readily distinguished by the pronotal and mesonotal markings, and in the male by the simplified structure of the gonapsis. There has been some question as to whether *sierra* is a distinct species or merely a colorational variety of *perfectus*. In Shasta County, where these two species are sympatric, *sierra* appears early in the season, and *perfectus* somewhat later, pointing to the possibility of some seasonal isolation; in 1981, *sierra* was relatively common while *perfectus* was scarce (R. B. Miller, pers. comm.) thus providing some indication of the independence of population fluctuations in these two taxa. The interaction of these two
species is at present under study by C. A. Tauber (pers. comm.),
who reports that they interbreed readily in the laboratory. Despite
this, because of the consistence of the colorational and male geni-
talic differences, plus slightly divergent seasonality, it seems prefer-
able to regard *sierra* as distinct.

*Mallada luctuosus* (Banks)

*Chrysopa luctuosa* Banks 1911:343.

**DESCRIPTION.** Green, antennae pale, head and thorax marked with
black and brown as in Fig. 18; brown stripes continue over meta-
thorax and abdomen. Thorax with longitudinal pleural stripe.
Forewings with bases of longitudinal veins, except costa and radius,
dark, transverse veins dark; hind wings less prominently dark-
veined. Abdominal sternites heavily dark-marked.

Genitalia. Arcessus (Fig. 19) elongate. Gonapsis (Fig. 15, 16)
with emergent process thin, ribbonlike apically with seta-like projec-
tions; anterior pocket wide-based. Spermatheca with tubular arcu-
ate vela inserted in doughnut shaped body, ventral impression
small.

**MATERIAL EXAMINED.** Holotype ♂, N.M., Ft. Wingate, 26.vi,
MCZ No. 11383. Additional: ARIZONA. Madera Can., Santa Rita
Mts., 16.viii.1949, P. Adams (PAAC); Cochise Co.: Huachuca Mts.,
Sunnyside, 14.vii.58, L. Martin (PAAC); Chiricahua Mts., S.W.
Research Station, 5 mi. W. Portal, 5400 ft., 1.viii.1966, R. E. Dietz
(PAAC), 28.vi.1960, J. M. Linsley (U. Calif. Davis); Globe, Pinal,
18.vii.1948, W. Nutting, F. Werner (MCZ). COLORADO. Mesa Verde
NEBRASKA. Meadville, 10.vi.31, B. Patterson (FMNH, Chicago).

**REMARKS.** This species is immediately recognizable among *Mal-
lada* species by the dark longitudinal veins and conspicuous black
and brown body markings. It is interesting to note that the forms of
the arcessus, gonapsis, and spermatheca are more similar to those of
*macleodi* than are those of *perfectus*, despite the extreme colora-
tional differences.
D. K. McE. Kevan encouraged one of us (J.A.G.) to study the Canadian chrysopid fauna, which led to discovery of the Ontario specimens and preparation of the draft manuscript and species description, including privately financed travel to Ottawa and Boston. Material for study was loaned by H. D. Blocker, Kansas State University (KSU); Mary Hathaway, and K. Jepson, Museum of Comparative Zoology, Harvard University (MCZ); J. E. H. Martin, Biosystematics Research Institute, Agriculture Canada, Ottawa (CNC); C. W. Agnew, Texas Agricultural Experiment Station; G. B. Wiggins and B. D. Marshall, Royal Ontario Museum (ROM), C. L. Hogue, Los Angeles County Museum of Natural History (LACMNH). R. B. Miller collected critical material of *M. sierra* and *perfectus*.

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