OXIDUS GRACILIS (Koch) and Orthomorpha coarctata (Saussure),
TWO MILLIPED PESTS IN FLORIDA

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SYNONYM: Fontaria gracilis Koch 1847, p. 142; Oxidus gracilis (Koch), Cook 1911, p. 631 (Type of genus by original designation);
Polydesmus coarctatus Saussure 1860, p. 207; Orthomorpha coarctata (Saussure), Bollman 1893, p. 149 (Type of genus by original designation).

TAXONOMY: The genera Oxidus and Orthomorpha are placed in the class Diplopoda, order Polydesmida, family Paradoxosomatidae. This family had been known for many years as the Strongylomorphae or Strongylomorphaeidae, but Jeekel (1963) presented reasons for recognition of Paradoxosomatidae.

INTRODUCTION: Two polydesmid species of millipedes most frequently encountered in Florida greenhouses, nurseries, and homes are the hothouse or greenhouse millipede, Oxidus gracilis (Koch) (fig. 1a), and the tropical millipede, Orthomorpha coarctata (Saussure) (fig. 1b). Both often occur in large numbers, causing concern that they may be causing serious injury to plants.

McDaniel (1931) reported that Oxidus gracilis was a serious problem in forcing houses because it ate tender shoots and roots of plants. However, extensive laboratory experiments with this species by Causey (1943) showed no evidence that either larvae or adults eat living plant tissue. Both immature and adults feed on loam, manure, or leafmold. In nature these and other millipedes have a share in the beneficial work of reducing dead plant material to humus. Prussic acid and other corrosive secretions of these millipedes may aid in the precipitation of colloidal substances in the humus. Both Oxidus gracilis and Orthomorpha coarctata have been accused of eating living plants or their roots or tubers, but probably they were eating the necrotic tissue resulting from injuries caused by man or machines, insect or other animal bites or tissue killed by disease. While they may become somewhat pestiferous in houses or around or in swimming pools, they do little direct damage, and their soil conversion activities greatly outweigh any damage they may do.

An additional concern of the homeowner is that these and other kinds of millipedes may be poisonous to humans. This mistaken belief probably is due to the superficial resemblance to the poisonous, many-legged centipedes, but millipedes are harmless to humans. While they do secrete free hydrocyanic acid from repugnatorial glands, they lack true poison glands. As a generalization they may be distinguished from centipedes by having 2 pairs of legs per body segment, whereas centipedes have 1 pair of legs per body segment. The mouthparts of millipedes are not adapted for biting or chewing, but are equipped with minute scrapers and combs for collecting soft, decaying materials. The only living plants that are eaten regularly by millipedes are the fleshy fungi.

LIFE HISTORY AND HABITS: Oxidus gracilis and Orthomorpha coarctata, like all other diplopods, are anamorphic, the larvae passing through several molts, during each of which the numbers of legs and postcephalic somites are increased. Additional legs and somites are added in the region between the anal somite that was formed last. In the 2 species treated here, 7 larval stadia can be distinguished by differences in body size and numbers of postcephalic somites and pairs of legs. The 2nd through the 7th take place in molting chambers constructed in the soil by the larvae. Studies by Causey (1943) indicated that under heated room temperatures 148-177 days are required for the development of the 7 larval stadia of Oxidus gracilis, and lower temperatures increase the length of these periods. Duration of each stadium increases successively from the 1st, which lasts approximately 24 hours, through the 7th, which lasts 60 or more days at heated room temperatures, and the 8th (adult), which may last more than 2 months. Females of all larval instars from the 4th through the 8th are larger and have 1 more pair of legs than the males. The eggs are deposited in the soil in clusters of 17-300 or more. Oviposition in greenhouses may occur during any month of the year under favorable conditions. This absence of a regular annual breeding season is typical of many tropical species of animals. Experiments by Causey (1943) showed that quick freezing temperatures over a period of 30 minutes are fatal, but that adults of Oxidus gracilis survived submersion in water 5-7 days. Oxidus and Orthomorpha, like most other millipedes, are essentially nocturnal, although on warm, overcast days and during periods of heavy rainfall, large numbers of specimens may be seen crawling about in the open.

DESCRIPTION: The 2 species are very similar in size and general appearance. Eggs of both species deposited in the soil are creamy yellow or occasionally brown, spherical or subspherical, smooth, and coated with a glutinous fluid which causes them to adhere in clusters of 17-300 or more. Adult males of both species vary between 18.5 and 20.0 mm in length and 2.0 and 2.5 mm in width; females vary between 19.4 and 22.2 mm in length and 2.0 and 2.5 mm in width. Antennae of both species are creamy white, but before they leave the molting chamber the color may change to light brown. In older specimens the dorsum is deep chestnut brown to black; the lateral projections, known as keels or carinae, are bordered with lemon yellow; the sides are chestnut brown; the sternum and basal joints of the legs are pallid, the distal joints of the legs and the

**DISTRIBUTION:** **ORTHOMORPHA COARCTATA** IS TROPICOPOLITAN, HAVING ORIGINATED IN THE MALAY ARCHIPELAGO. IT HAS BEEN OR PROBABLY WILL BE FOUND IN OR NEAR MOST LARGE URBAN AREAS OF MEXICO AND CENTRAL AMERICA. IN FLORIDA IT IS RESTRICTED TO THE CENTRAL AND SOUTHERN PORTIONS OF THE PENINSULA, LIKE **OXIDUS GRACILIS** OCCURRING COMMONLY IN NURSERIES AND IN NATURAL AREAS. IT HAS BEEN REPORTED FROM LOUISIANA AND TEXAS. **OXIDUS GRACILIS** ORIGINATED IN THE EAST INDIES AND IS COSMOPOLITAN IN GREENHOUSES. IT OCCURS IN THE OPEN IN MUCH OF MEXICO AND CENTRAL AND SOUTH AMERICA AND THROUGHOUT FLORIDA NORTHWARD TO SOUTHERN OHIO. IT IS DISTRIBUTED GENERALLY IN GREENHOUSES THROUGHOUT MUCH OF THE UNITED STATES AND CANADA. IT HAS BEEN FOUND IN 1 CAVE IN PENNSYLVANIA.

**CONTROL:** WHERE THESE MILLIPEDES OCCUR IN SUFFICIENTLY LARGE NUMBERS TO BE A NUISANCE, THEY MAY BE CONTROLLED WITH BAYGON OR SEVIN. READ LABEL CAREFULLY FOR DOSAGE, APPLICATION DIRECTIONS, AND CAUTIONS REGARDING CONTROL OF MILLIPEDES.

**REFERENCES:**


Carr, B. N. 1943. Studies on the life history and the ecology of the hothouse millipede, **ORTHOMORPHA GRACILIS** (C. L. Koch 1847). Amer. Midland Nat. J. 35(1):670-682, 3 Fig. 3 Tab.


Rohwer, H. G. 1935. An example of myriapods as mill formers. Ecology 16(1):67-71, 2 Fig.


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**Fig. 1a. Oxidus gracilis** (Koch)

**Fig. 1b. Orthomorpha coarctata** (Sauvage)

**Fig. 2a. Male gonopod of Oxidus gracilis** (Koch)

**Fig. 2b. Male gonopod of Orthomorpha coarctata** (Sauvage)