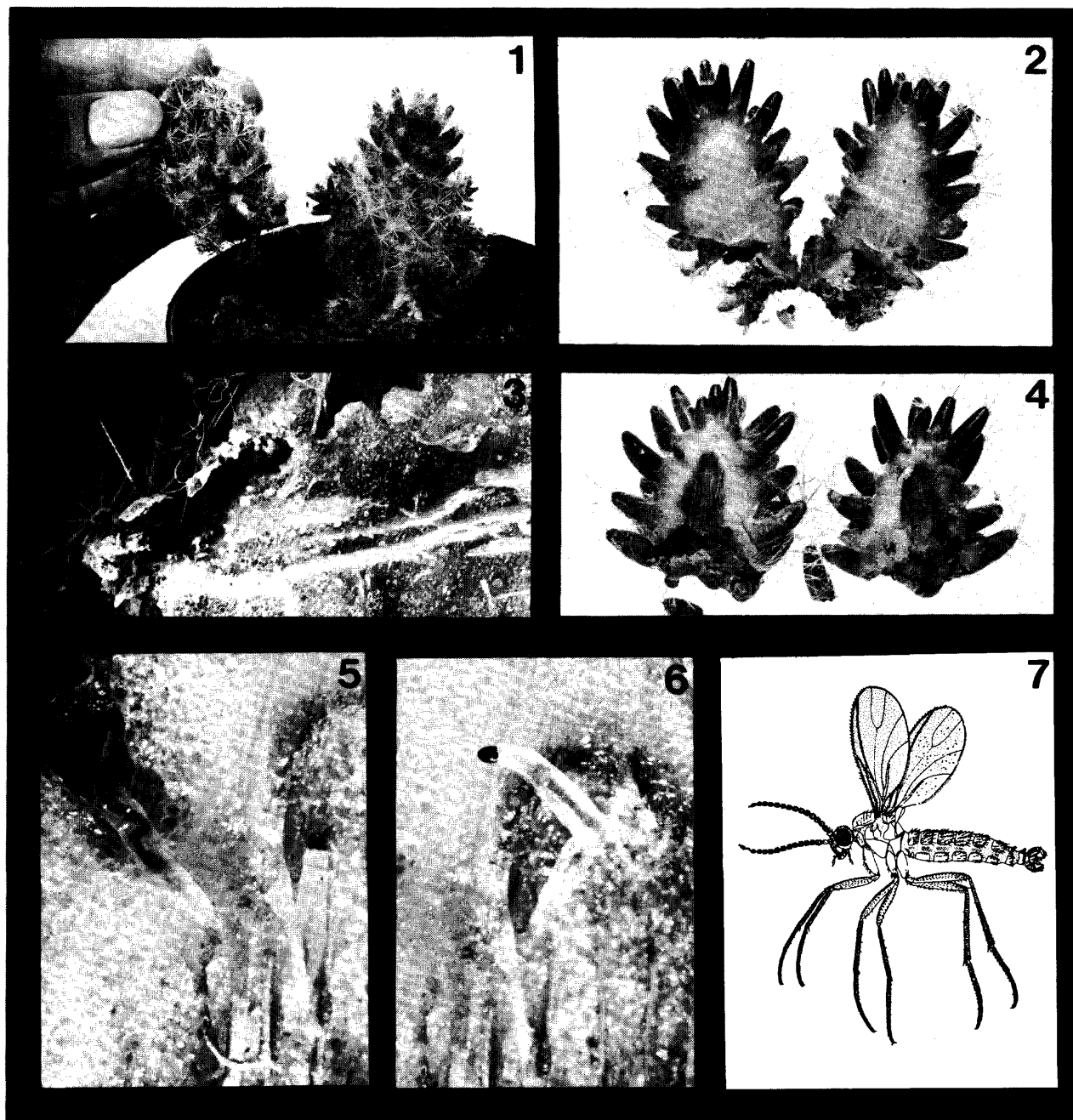


DARKWINGED FUNGUS GNATS, BRADYSIA SPP., IN FLORIDA GREENHOUSES

(DIPTERA:SCIARIDAE)<sup>1</sup>

Frank W. Mead<sup>2</sup>



1/ Contribution No. 406, Bureau of Entomology

2/ Taxonomic Entomologist, Div. Plant Ind., P. O. Box 1269, Gainesville, FL 32602

Fig. 1-4, Various degrees of damage to mammillaria cactus by larvae of a sciarid, Bradysia coprophila (Lintner). Fig. 5-6, B. coprophila larvae feeding on cactus tissues. Fig. 7, Adult male darkwinged fungus gnat, B. coprophila from Steffan (1966) slightly modified.

INTRODUCTION: Most species of darkwinged fungus gnats (Sciaridae) feed on fungi and decaying organic matter and are not considered economic problems. A few species, however, attack healthy tissue of such economic plants as potatoes, wheat, red clover, alfalfa, cultivated mushrooms, pine seedlings, and various ornamentals, including tulip bulbs, ferns, begonias, coleus, geraniums, cacti, young orchids, areca palm, and dracaenas. In recent years there has been an increasing number of complaints about sciarids being a problem in Florida greenhouses, mostly concerning injury to plants but also large numbers of flying gnats being an occasional nuisance to workers. Some growers have had difficulty achieving adequate control of these fungus gnats, and more information is needed on effective insecticides, dosage rates, methods of application, and possible phytotoxicity.

DESCRIPTION: Adults (fig. 7) small, up to 1/8 inch (3mm) delicate flies, dark brown body, dusky wings, small head, rounded, moderately prominent eyes that meet above the bases of the thread-like antennae, legs and wings comparatively long. Larvae (fig. 5-6) white, slender, legless, with a black head and smooth semi-transparent skin revealing digestive tract contents, length when fully grown 1/4 inch (6mm). Valley (1975) described behavior of adult sciarids near infested potted plants, soil, etc. He wrote that when disturbed, the gnats run rapidly or take flight, which usually consists of short darting or hovering movements over a small area.

SYNONYMY: Formerly a subfamily in Mycetophilidae, and, for a time, sciarids were called lycoriids (Lycoriidae); many of the species formerly in Sciara and Neosciara are now in Bradysia.

DISTRIBUTION: Steffan (1966) reported that Bradysia was represented by 65 species in North America and is the largest genus in the family in North America and Europe. It also is found on all other continents and on most of the major islands. In the USA the species seem to be mostly northern and western. Examples of Bradysia have been collected from all regions in Florida, but very few have been determined to species. Based upon the available literature, R. J. Gagné, USDA Systematic Entomology Lab, Washington, D. C., has identified sciarids from greenhouses in the Apopka area, Orange County, as Bradysia coprophila (Lintner) and Bradysia impatiens (Johannsen). Also he has identified B. coprophila from Punta Gorda, Charlotte County, and Gainesville, Alachua County.

IDENTIFICATION: In North America, the key to sciarid genera by Shaw (1953) has been superseded by Steffan (1966). Identification at the species level is difficult, based primarily upon males which must be cleared with NaOH or KOH and mounted on slides, a somewhat delicate procedure. The primary references are Johannsen (1912) and Pettey (1918), but as Steffan (1966) pointed out, many of the older descriptions are inadequate by current standards, and type material must be seen to insure accuracy of determinations.

BIONOMICS: The bionomics of Bradysia impatiens are well treated in the 2 papers by Wilkinson and Daugherty (1970a,b), which were inspired by observations of Daugherty in 1965 that larvae of B. impatiens attacked roots of soybean seedlings grown under aseptic conditions in a laboratory. They (1970a) reported that at 75 F (24 C) in the laboratory the average fecundity of a female was 75 eggs, and length of life cycle about 27 days; however, when temperatures were fluctuated to produce optimum development, the life cycle was about 19 days. Kennedy (1974) reported that the strain of B. impatiens he worked with had greater fecundity and shorter mean developmental time (15.6 days at 77 F) (25 C) than the population used by Wilkinson and Daugherty. Kennedy (1974) reported on the significance of fungi in survival and development of B. impatiens, a fungus gnat found commonly in greenhouses of New York State. He reported that larvae of this species frequently feed on the root and stem tissue of many greenhouse plants. His experiments suggested that fungi provide an essential nutrient source for the larvae of B. impatiens, and that if fungi are in low supply in the immediate vicinity of a living plant, there is a tendency for the larvae to use the plant as an alternate food source. Hungerford (1916) reported the life cycle of Sciara (= Bradysia) coprophila was 24-32 days from egg-laying to egg-laying. Thomas (1931) presumably working with coprophila, wrote that the life cycle from date of egg laying to date of fly emergence was 18-23 days at 63-70 F (17-21 C). At lower temperatures development time was longer. Both Hungerford (1916) and Thomas (1931) illustrated life history stages of coprophila and plant damage caused by it. In Florida, the Florida State Collection of Arthropods has a record of B. coprophila being a severe problem on Christmas cactus, Zygocactus truncatus Schum., at a research center in Apopka during August 1977. There also is a record of it damaging 50% of 1000 seedlings of longleaf pine, Pinus palustris, at Punta Gorda during February 1975. The collector, Charles W. Chellman, noted the larvae invaded the tap roots and fed also on lateral roots near the soil line.

CONTROL: In past years diazinon drench has been used for fungus gnat control in Florida greenhouses. However, fungus gnats are not included on the diazinon label at the present time, and under the EPA law, both the pest and the plant must appear on the pesticide label. Recently oxamyl (Vydate L) was registered by the State of Florida for use in controlling fungus gnats on Christmas cactus, Z. truncatus. Oxamyl is to be used only by commercial nurserymen. It is a systemic insecticide that normally is applied about once every 3 weeks at the rate of 1 quart/100 gal (.95 liter/379 lit.) or 2 teaspoons/gal. Extension and research entomologists at the University of Florida suggest spraying all areas in the greenhouse, particularly all areas with soil, such as on and under benches and the soil of potted plants. Most of the larvae are in the top inch of soil. Also, rogue out any old plants and rotting materials. Avoid overwatering plants, since fungus gnats require moist to very moist soil or substrate for development. Valley (1975) reported that dichlorvos (Vapona) aerosol or vapor can be used against adult flies. Steffan (1966) reported that in general both commercial greenhouse firms and commercial mushroom growers, practicing good cultural techniques, sustain very few losses from direct sciarid injury. R. I. Sailer (personal communication, 1977) reported that for small scale activities, before reusing potting soil, he has successfully prevented build up of damping-off organisms and sciarid flies by means of a scalding hot water treatment.

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