Biology of *Euseius mesembrinus* (Acari: Phytoseiidae): Life Tables on Ice Plant Pollen at Different Temperatures with Notes on Behavior and Food Range

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ABSTRACT


*Euseius mesembrinus* (Dean) (Acari: Phytoseiidae) was recently reported on Florida citrus for the first time. This mite was able to develop and reproduce when fed plant pollen of Spanish needle, *Bidens pilosa* L. and ice plant, *Malephora crocea* (Jacq.) or three spider mite species (Acari: Tetranychidae) including all stages of *Tetranychus urticae* Koch, *Eutetranychus banksi* (McGregor), and larval and nymphal stages only of *Panonychus citri* (McGregor).

The biology of *E. mesembrinus* was studied under laboratory conditions while being fed pollen of *M. crocea*. The developmental time for immature stages at 18, 22, 26, and 30 °C was 11.50, 7.47, 4.54, and 4.40 days, respectively. This pattern fits a log-probit model with $r^2 = 0.940$. Eggs hatched, but mortality in other stages was high at 34 °C. The intrinsic rate of natural increase was 0.146, 0.250, and 0.246 at 22, 26, and 30 °C. The optimum temperature for this phytoseiid to develop and increase on ice plant pollen was in the range of 26 to 30 °C.

INTRODUCTION

*Euseius mesembrinus* (Dean) was first described in the genus *Typhlodromus* as a new species of the *finlandicus* complex. The mite was found in Texas in association with *Oligonychus pratensis* (Banks) on corn and sorghum leaves (Dean, 1957). *E. mesembrinus* also was reported from Louisiana in 1975 (H.A. Denmark, personal communication, 1984) and recently from Florida citrus (McCoy and Rakha, 1985). This mite was not included in the extensive survey...
for Florida Phytoseiidae by Muma and Denmark (1970). Browning (1983) reported this mite as the prevalent phytoseiid occurring on citrus in the Lower Rio Grande Valley area of south Texas throughout the year. This species may have been established in Florida during the last decade due to movement of citrus seedlings from Texas to Florida.

The redefinition of the genus *Euseius* by McMurtry (1983) included 60 or more species with relatively uniform morphology and biology. All species studied are general feeders that increase more rapidly on pollen than on mite prey. The biology of related species, *E. hibisci* (Chant), and *E. citrifolius* (Denmark and Muma) was studied by McMurtry and Scriven (1964, 1965a), Swirski et al. (1970), and Tanigoshi et al. (1981), and Moraes and McMurtry (1981) using a plant leaf surface. Porres et al. (1975) demonstrated feeding by *E. hibisci* on avocado leaf sap but not on lemon using radioactive phosphoric acid. They concluded that plant juice may provide an alternate source of food and/or moisture.

Life table studies were undertaken to determine the developmental biology and behavior of *E. mesembrinus* at different temperatures when fed ice plant pollen, *Malephora crocea* (Jacq.).

**MATERIALS AND METHODS**

Observations were made on *E. mesembrinus* behavior and its ability to feed and develop utilizing the following diets: pollen of Spanish needle, *Bidens pilosa* L.; two-spotted spider mite, *Tetranychus urticae* Koch; Texas citrus mite, *Eutetranychus banksi* (McGregor); and the citrus red mite, *Panonychus citri* (McGregor).

Techniques for rearing phytoseiid mites were reported by Ristich (1956); McMurtry and Scriven (1964, 1965b); Swirski et al. (1967, 1970); Rasmy (1970); Tanigoshi et al. (1981); and Moraes and McMurtry (1981) where a plant leaf surface was used as the rearing substrate and pollen as the food source.

The laboratory culture of *E. mesembrinus* used in this study originated from grapefruit and orange leaves collected from commercial groves located near Lake Alfred and Wauchula in central Florida during February and March, 1984. The culture was colonized on the underside of excised leaves from grapefruit, *Citrus paradisi* Macf. seedlings and held at 26°C. Ice plant, *M. crocea*, flowers were collected daily from plants maintained in the greenhouse. The anthers were cut, frozen, and used in mite feeding as needed. Ice plants were obtained from a culture plot maintained at the University of California, Riverside.

Ice plant pollen was evaluated in California for rearing *E. hibisci* and found to be a suitable and prolific food source (McMurtry and Scriven, 1964; Tanigoshi et al., 1981). Use of the same pollen in our studies provides for better comparison of results with other species in the genus *Euseius*. Pollens from