

THE PHYTOSEIID MITE *PHYTOSEIUS PLUMIFER*
AS A PREDATOR OF THE ERIOPHYID MITE
ACERIA FICUS [ACARINA]

BY

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The effects of the eriophyid mite *Aceria ficus* COTTE, the tetranychid mite *Tetranychus arabicus* ATTIAH and castor-oil pollen on the development and fecundity of the phytoseiid predator *Phytoseius plumifer* (C. & F.) were studied. The feeding capacity of all developmental stages of *P. plumifer* on *A. ficus* was also considered.

A. ficus was noted to be the more preferable prey to the predator rather than *T. arabicus*. Pollen promoted a marked suppression in the predator's reproduction.

Survey of mites associated with fig trees in Egypt showed that the phytoseiid predator, *Phytoseius plumifer* (CANESTRINI & FANZAGO) was prevalent and that the eriophyid mite, *Aceria ficus* COTTE was the main acarine pest (RASMY & ABOAWAD, 1972). Recent field work by the authors (in preparation) indicated that the population of *P. plumifer* correlated positively with the population of *A. ficus* which reached a noxious level on fig trees.

Several authors considered *P. plumifer* among the most important predators of phytophagous mites infesting fruit trees in Egypt (ZAHER *et al.*, 1969; RASMY & ELBANHAWY, 1974). The considerable number of this predator encountered on fig at times of absence of *A. ficus* infestation suggested that food other than the eriophyid mite played an important role in the survival of this phytoseiid mite. Other phytoseiid mites were recognized to utilize, in times of food shortage, other food materials rather than animal prey (McMURTRY & SCRIVEN, 1965; PUTMAN, 1962).

The present study was initiated to evaluate *P. plumifer* as a predator of *A. ficus*. The effects of *A. ficus*, *Tetranychus arabicus* ATTIAH and the pollen grains of castor-oil *Ricinus communis* on the development and reproduction of this predator were also studied. The last two diets were tested because *T. arabicus* was observed as a secondary acarine pest infesting fig trees, whereas pollen was frequently drifted on fruit trees.

Materials and methods

The predatory mite was confined singly on leaf discs of fig *Ficus carica*, 2.5 cm in diameter. The leaf discs were placed with the upper surface in contact with plastic foam saturated with water in Petri dishes.

To determine the effects of the different diets on the development and fecundity of *P. plumifer*, 3 tests were devised. Twenty newly hatched predator larvae were reared in each test. Feeding on *A. ficus* was conducted by using fig leaves infested with moving stages of this species as a substrate for rearing the predator to avoid damage caused by transference to clean leaf discs. Each leaf disc carried about 3-35 individuals. The leaf discs were changed daily to maintain ample food supply. Consumed eriophyids were recorded. Predators feeding on *T. arabicus* were supplied with 20 immatures per predator. Consumed tetranychids were replaced daily with new ones, Pollen bred received fresh pollen grains every 2-3 days.

TABLE 1

Average number of A. ficus consumed per day by the developmental stage of P. plumifer

Larva	Protonymph	Deutonymph	Preoviposition	Adult
0	16.0 ± 2.3	11.9 ± 3.0	12.0 ± 0.5	22.0 ± 0.5

TABLE 2

Duration (in days) of the developmental stages and fecundity of P. plumifer reared on three food substances

Food	Larva	Protonymph	Deutonymph	Immatures*
<i>A. ficus</i>	1.0 ± 0	1.8 ± 0.2	2.0 ± 0.3	4.8 ± 0.4
<i>T. arabicus</i>	1.1 ± 0.1	2.6 ± 0.2	1.8 ± 0.6	5.5 ± 0.6
Pollen	1.0 ± 0.	2.4 ± 0.2	2.0 ± 0.3	5.4 ± 0.3

* Differences were not significant ($P < .05$), F - test.

The mites were observed daily to determine the developmental periods of the different immature stages. When the individuals reached adulthood, each female was coupled with a male to secure mating. Numbers of eggs deposited during 14 successive days were recorded. The experiments were conducted in the laboratory at a temperature of 25°C and 70 % R.H.

Results and discussion

FOOD CONSUMPTION

The different developmental stages of *P. plumifer* consumed considerable numbers of *A. ficus* (table 1). The female predator

reared on *A. ficus* was able to consume about 22.5 ± 0.8 individuals daily, whereas female maintained on *T. arabicus* consumed about 6.9 ± 0.2 individuals per day.

Feeding observation showed that large castor-oil pollen grains were pierced by the developmental stages of the predator.

DEVELOPMENT

The predator larvae confined on the three different diets developed normally. *A. ficus* promoted a slightly faster development of the predator than when fed on *T. arabicus* or pollen (table 2).

OVIPOSITION

The three tested sorts of food insured the nutritional requirements for predator production. The number of eggs deposited per female during 14 successive days was 24.0 ± 1.6 , 21.3 ± 1.6 and 14.4 ± 1.3 when the predator was fed on *A. ficus*, *T. arabicus* and pollen respectively. However the mite prey favoured more egg production, whereas pollen significantly reduced oviposition. (F-test : $P < 0.05$).

From the foregoing results it can be concluded that the eriophyid mite *A. ficus* is a preferable prey for the predatory mite *P. plumifer*. *T. arabicus* is also a favourable prey for the predator but it seems to be a secondary prey.

The capability of *P. plumifer* to survive on pollen favours this predator to exist in the field during the lack of its natural prey, although this non-prey diet markedly suppressed the egg production of the predator. This would explain the frequent occurrence of this predatory mite on fruit trees during the absence of phytophagous mites.

RÉSUMÉ

L'acarien phytoseiide, *Phytoseius plumifer*, prédateur de l'acarien eriophyide, *Aceria ficus*.

Étude des effets de l'eriophyide *Aceria ficus* COTTE, du tetranyque *Tetranychus arabicus* ATTIAH, et du pollen de ricin sur le développement et la fécondité du phytoséiide prédateur, *Phytoseius plumifer* (C & F). On a considéré également la consommation de *A. ficus* par les différents stades de développement de *P. plumifer*. Il a été constaté que *A. ficus* est la proie préférée par rapport à *T. arabicus*. Le pollen détermine une suppression nette de la reproduction du prédateur.

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