

EXPLORATIONS FOR NATURAL ENEMIES OF THE CASSAVA GREEN MITE IN BRAZIL

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Abstract:

The cassava green mite (*Mononychellus tanajoa* (Bondar)) is today one of the most important pests of cassava in Africa. Explorations for efficient natural enemies of that pest were initiated in Brazil in the beginning of 1988 through an agreement between Africa-wide Biological Control Program/International Institute of Tropical Agriculture and the Empresa Brasileira de Pesquisa Agropecuaria (EMBRAPA). The work consists basically of 2 major components. The first refers to the identification of areas with consistently low infestations of the mite and determination of the natural enemies associated with it. The second refers to field estimations of the efficiency of the natural enemies found. Until now, the most widespread natural enemies detected were the predaceous mites *Amblyseius idaeus* (Denmark and Muma) and *Amblyseius limonicus* Garman and McGregor s.l., the former in drier and the latter in more humid places.

Introduction

Cassava (*Manihot esculenta* Crantz) was introduced from tropical America to Africa in the 16th Century (Jones, 1959) and today it is one of the main sources of carbohydrates in many of the tropical African countries.

In the beginning of the 1970's, two important cassava pests, native to South America, were found for the first time in Africa, and since then have been of great concern to cassava growers (Yaninek and Herren, 1988). Considering the international threat posed by those pests, a major effort was initiated by the Africa-wide Biological Control Programme (ABCP) of the International Institute of Tropical Agriculture (IITA), seeking to alleviate the problem through biological control (Herren, 1987).

One of those pests is the cassava green mite (CGM), *Mononychellus tanajoa* (Bondar), which was described in 1938 based on specimens collected in the state of Bahia, Brazil. Often the most effective natural enemies of an organism are found in its place of origin; thus, an initial concern of ABCP consisted in looking for promising natural enemies of this pest in South America. In 1988 an agreement was made between ABCP and the Empresa Brasileira de Pesquisa Agropecuaria (EMBRAPA) for the survey and ecological studies of the natural enemies of the CGM in Brazil, as a complement to the work presently conducted by the Centro Internacional de Agricultura Tropical (CIAT) in several South and Central American countries.

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Methodology

Based on climatic similarities, it was decided that priority should be given to conduct the exploration in the northeastern part of Brazil, a region roughly located between 1 and 18° S latitude and 35 and 47° W longitude, covering an area of over 1.5 million km². This area is characterized mainly by its irregular rainfall pattern in time and space. The average annual precipitation can vary from about 250 mm to over 2,000 mm (Hargreaves, 1973). Considering the areas where the CGM is a major problem in Africa, it was decided to emphasize the search in areas with an annual rainfall of 700 to 1,200 mm.

The work consists basically of two major components. The first refers to a thorough scanning of the region in order to identify areas with consistently low infestations of CGM and to detect the natural enemies associated with it. This is accomplished in missions which are done at different periods of the year, taking into account the different rainfall patterns of the areas to be visited. In each mission, stops are programmed at each 40–50 km, and about 30 minutes to 1 hour is spent collecting at each stop. The first few specimens collected are preserved for later identification. Further specimens are transported alive to the laboratory on cassava leaves put inside 6×8×13 cm plastic boxes. There, the predaceous mites of the family Phytoseiidae are reared by the methods proposed by McMurtry and Scriven (1965) or Mesa and Bellotti (Bellotti *et al.*, 1987), to obtain a sufficient number of specimens to ship to Africa.

The second component corresponds to field estimations of the efficiency of the natural enemies. Basically, it refers to a study of the fluctuation of the populations of the CGM and its predators as well as tests involving the chemical elimination of the predators to observe the corresponding response of the CGM. The work is under way, and it is still too early for any conclusions to be drawn.

Preliminary Results and Discussion

After a six month period of collection, a total of 130 cassava fields were evaluated. In those fields, the most common natural enemies associated with CGM were predaceous mites of the family Phytoseiidae (Table 1). Thirteen phytoseiid species were found, but only two of those had a widespread distribution, namely *Amblyseius idaeus* (Denmark and Muma) and *Amblyseius limonicus* Garman and McGregor s.l.. The former species has been found in drier and the latter in more humid places. Other species were found in very few fields. All species were previously known from Brazil, on several plant species (Moraes *et al.*, 1966). With the exception of *Euseius ho* (DeLeon), all species were previously found on cassava in Colombia by CIAT (Bellotti *et al.*, 1987), although the two regions are several thousand kilometers apart, separated by the Amazon forest.

The following species are being maintained in colonies in the laboratory at Petrolina for later shipment to Africa; *Amblyseius aerialis* (Muma), *A. anonymus* (Chant and Baker), *A. idaeus*, *A. limonicus*, *Euseius concordis* (Chant), *Phytoseiulus macropilis* (Banks) and *Typhlodromus annectens* (DeLeon).

I. Predaceous mites of the family Phytoseiidae found on cassava in different localities in northeastern Brazil.

Species	Number of localities
<i>Mononychellus aerialis</i> (Muma)	1
<i>A. anonyms</i> Chant & Baker	3
<i>A. oryzae</i> (DeLeon)	5
<i>A. herbicolus</i> (Chant)	1
<i>A. idarus</i> (Denmark and Muma)	47
<i>A. limonicus</i> Garman and McGregor s.l.	21
<i>A. chusagui</i> (Denmark and Muma)	1
<i>Lasius alatus</i> (DeLeon)	1
<i>L. concordis</i> (Chant)	2
<i>L. ho</i> (DeLeon)	3
<i>L. abelius</i> (DeLeon)	1
<i>Phytoseiulus macropilis</i> (Banks)	1
<i>Tiphlodromus annectens</i> DeLeon	2

It is expected that the work under way will contribute to a better knowledge of the CGM in northeastern Brazil and to identify the most promising natural enemies to be used under diverse climatic conditions in Africa.

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