

## First record of *Oligonychus ilicis* McGregor (Acari: Tetranychidae) on blueberry in Michoacán

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### Abstract

The mite, also known as the southern red mite or the coffee red mite *Oligonychus ilicis*, was recorded for the first time in the orchards located in the locality of Huaniqueo, in the municipality of Salvador Escalante, Michoacán, on three-year-old plants of *Vaccinium corymbosum* variety 'sharp blue', detected during control samplings on October 13 and 18, 2021. Mites were found in abundance and caused severe damage to the plant. This first report on *O. ilicis* aims to provide timely information to contain the spread of a serious phytosanitary problem.

### Keywords:

*Vaccinium corymbosum* , new pest, southern red mite.

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With the globalization of blueberry (*Vaccinium corymbosum* L.), the risk of attack by pest arthropods has intensified; especially in areas with the recent introduction of this crop (Rodríguez-Saona *et al.*, 2019). In relation to the other berries, the blueberry presents little incidence of damage by mites and insects, although it is not exempt from their attack (Rodríguez-Saona *et al.*, 2019; Ortiz *et al.*, 2020). Phytophagous mites of the Tetranychidae family include some of the most important pests in agriculture and silviculture; until 2019, 1321 valid species had been described, reported in 3917 species of host plants (Migeon and Dorkeld, 2022), including the Ericaceae family in *Vaccinium* species.

*Oligonychus ilicis* McGregor was first described in 1917 when attacking American Holly (*Ilex opaca*: Aquifoliaceae) trees in South Carolina, United States of America (Toledo *et al.*, 2018). This mite is also known as the southern red mite or the coffee red mite, a crop where it represents a significant threat (da Silveira *et al.*, 2020; Liburd *et al.*, 2020). It feeds on more than 34 host plants from 15 different families, it has caused economic damage to a wide range of ornamental and fruit plants (Denmark *et al.*, 2006; Toledo *et al.*, 2018; Liburd *et al.*, 2020). Since 2006, Denmark and collaborators identified it in cranberry *Vaccinium macrocarpon* Aiton, 1789, for the United States of America.

In other host plants until that date, it had also been recorded in Brazil, Italy, Japan, Korea, the Netherlands, and Paraguay, it was also reported in Australia, but later the Department of Agriculture, Fisheries and Wildlife announced that it had been eradicated. Lopez and Liburd (2020) report the southern red mite (*O. ilicis*) as the most important pest tetranychid in *V. corymbosum* orchards for causing severe infestations in the southern United States of America, and which has increased in recent years and has generated losses of up to 80% to 100% in some blueberry plantations.

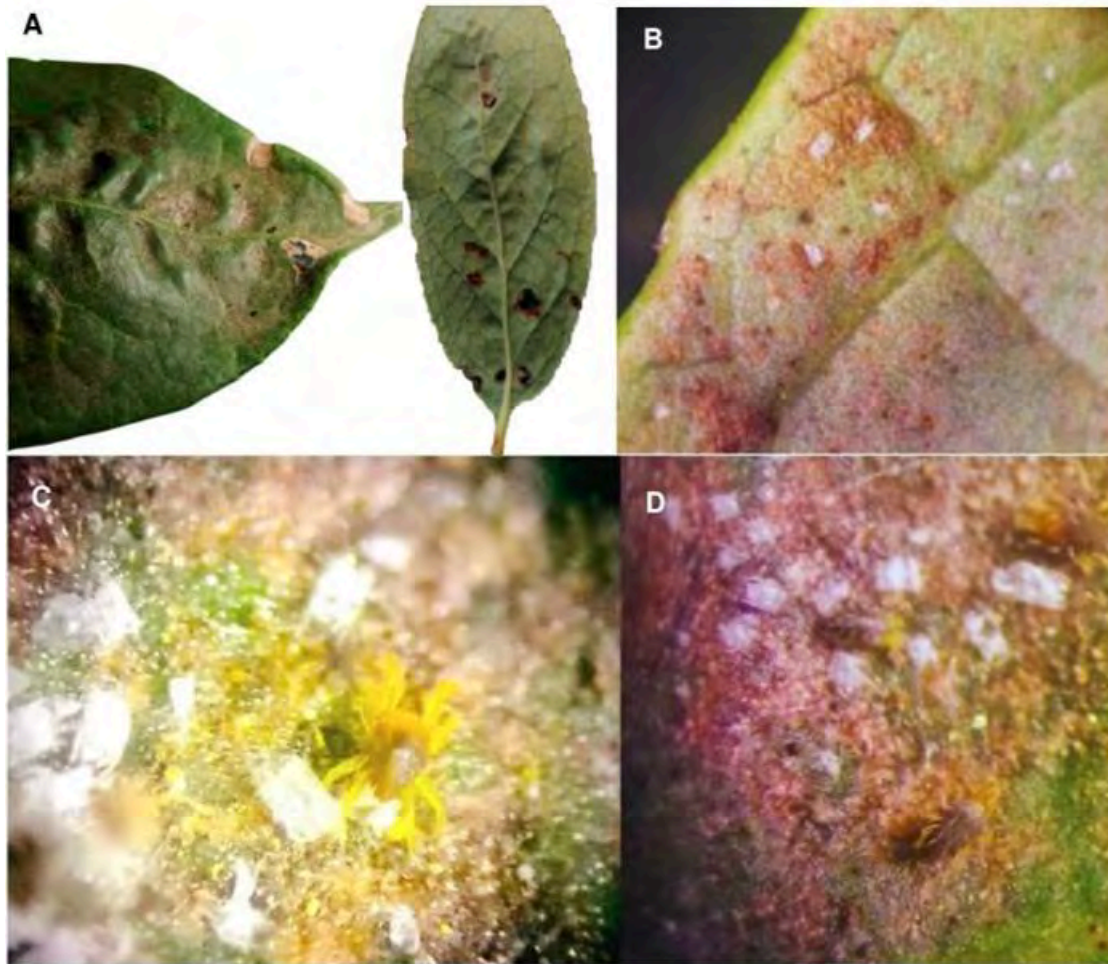
On the other hand, the knowledge of pest mites in Michoacan blueberry *V. corymbosum* crops is very scarce, four associated phytophagous mites have been reported by Bucio-Soto *et al.* (2016): *Panonychus ulmi* (Tetranychidae), *Tydeus* (Afrotydeus) *ca. meyeræ* (Tydeidae) and two tarsonemids, *Tarsonemus* sp., and *Hemitarsonemus* sp., these were determined by collections made in the municipality of Sircarter on plants of the *biloxi* variety, however, none of these species has expressed economic concern in the state, and their level of agricultural impact is unknown.

Given the importance of this crop in the state, constant monitoring is done to know the phytosanitary status of blueberry *V. corymbosum* plants in different regions and varieties.

The collections were made in the orchards located in the locality of Huaniqueo, in the municipality of Salvador Escalante, Michoacán, with the coordinates 19° 20' 13.2" north latitude and 101° 38' 55.5" west longitude on three-year-old plants of *V. corymbosum* variety 'sharp blue'. During control samplings carried out on October 13 and 18, 2021, plant material with symptoms of damage by mites of the Tetranychidae family was recovered, a collection was carried out directly on leaves that showed feeding incidences, presence of exuviae from molting and silk (Figure 1 A and 1B).



Figure 1. Presence and damage of tetranychid *Oligonychus ilicis* in blueberry var. sharp blue. A) leaves on the adaxial face and abaxial face with symptoms of mite damage; B) exuviae from molting and feeding damage; C) females, males, and exuviae on damaged leaf adaxial face; and D) male and exuviae (photos MVS).



Once the plant structures were selected, they were placed in Ziploc<sup>®</sup> polyethylene bags with hermetic closure, later, they were transported to the Entomology Laboratory, of the Faculty of Biology, at the Michoacan University of San Nicolás de Hidalgo. Approximately 40 leaves and tender buds were recovered, these were reviewed individually in a stereoscopic microscope, and with the help of dissection needles, females, males, and immatures were separated for mounting on slides through the methodology proposed by Walter and Krantz (2009) with Hoyer's liquid.

For taxonomic determination, a phase-contrast microscope (DM2000, Leica Microscopes International) was used, with the dichotomous keys by Pritchard and Baker (1955), the species was identified and corroborated with the interactive key and diagnostics for all species of spider mite (Acari: Tetranychidae) registered in Australia (Beard, 2018).

Only 20 individuals were mounted, six males and the rest females and immatures, which were deposited in the reference collection of the Entomology laboratory. Through observations and taxonomic keys, it was determined that the tetranychid found belongs to the species *Oligonychus ilicis*. The specimens examined matched the typical characteristics of the species: both sexes are

reddish-brown (Figures 1 C and 1D), darker than most tetranychids known as spider mites, and translucent towards the front end of the body.

The female is slightly larger than the male and has a rounded or elliptical shape of the opisthosoma (Figure 1C).

The males are narrower, with the opisthosoma in the form of V (Figure 1C), and the aedeagus ends in a pointed hook (Figure 2), determining character in this species (Denmark *et al.*, 2006). They can develop several overlapping generations during the year under optimal conditions ( $25 \pm 2$  °C) and complete one generation in two weeks (Denmark *et al.*, 2006; Liburd *et al.*, 2020).

Figure 2. Aedeagus of the male of *Oligonychus ilicis* (photo MVS).



They prefer high to temperate temperatures, endure the wet winter, and can be found throughout the year, as they manage to remain in diapause until the environment favors them (Lopez and Liburd, 2020).

Generally, they attack the abaxial face of the leaf, and as the population increases, they move to the adaxial face, if the colonies are numerous, they invade the stems and tender shoots (Liburd *et al.*, 2020; Lopez and Liburd, 2020). Unlike what was reported by these authors, mites were found in abundance in the leaf adaxial face, this caused a tan or redness (regularly dotted) similar to the damage that *Oligonychus punicae* does in avocado leaves (Figure 1A), a consequence of the degradation of the plant mesophyll, and this leads to defoliation (Denmark *et al.*, 2006; Liburd *et al.*, 2020).

The leaves can become deformed if they are infested with large populations of *O. ilicis*, where young or growing leaves are the most vulnerable to aggression, which coincides with what Lopez and Liburd (2020) found. It has been reported that the severity of its damage reduces the photosynthetic capacity between 37% and 50% in coffee plants (Toledo *et al.*, 2018), this case can be similar to what happened in blueberry.



## Conclusions

This first report on *O. ilicis* provides timely information to contain the spread of a possible serious phytosanitary problem. This pest mite represented a clear threat to blueberry crops, not only in Michoacán but in Mexico; it is advisable to expand the monitoring to know its spread, it is speculated that this tetranychid entered with plants brought from Florida and is already widespread in more localities of the region and neighboring municipalities are not ruled out. It is of utmost importance to work with producers to monitor the spread of the southern red mite and create appropriate management strategies.

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