Eutetranychus orientalis

Scientific Name
Eutetranychus orientalis Klein

Synonyms:
Eutetranychus anneckei, *Eutetranychus latus, Eutetranychus monodi*, *Eutetranychus sudanicus*, *Anychus latus, Anychus orientalis*, and *Anychus ricini*

Common Name(s)
Citrus brown mite, oriental mite, oriental red mite, oriental red spider mite (Avidov and Harpaz, 1969), oriental spider mite, Lowveld citrus mite (in South Africa), and citrus mite (EPPO/CABI, 1997).

Type of Pest
Mite

Taxonomic Position
Class: Arachnida, **Order:** Acarina, **Family:** Tetranychidae

Reason for Inclusion In Manual
CAPS Target: AHP prioritized Pest List 2006 through 2009

Pest Description
The genus *Eutetranychus* is characterized by its empodium, which is reduced to a small protuberance (Avidov and Harpaz, 1969). The life cycle of *E. orientalis* is completed in four active (larva, protonymph, deutonymph, and adult) and three quiescent stages (nymphochrysalis, deutochrysalis, and teleochrysalis) (Lal, 1977; CAPS 2010).

Eggs: The eggs of *E. orientalis* are oval or circular with a disc-shaped appearance (Fig. 1), 140 µm in diameter (Avidov and Harpaz, 1969), and flattened. They come to a point dorsally but lack the long dorsal stalk of other spider mites. Newly laid eggs are bright and hyaline, but later they become a yellow, parchment-like color (Smith-Meyer, 1981; CAPS 2010).

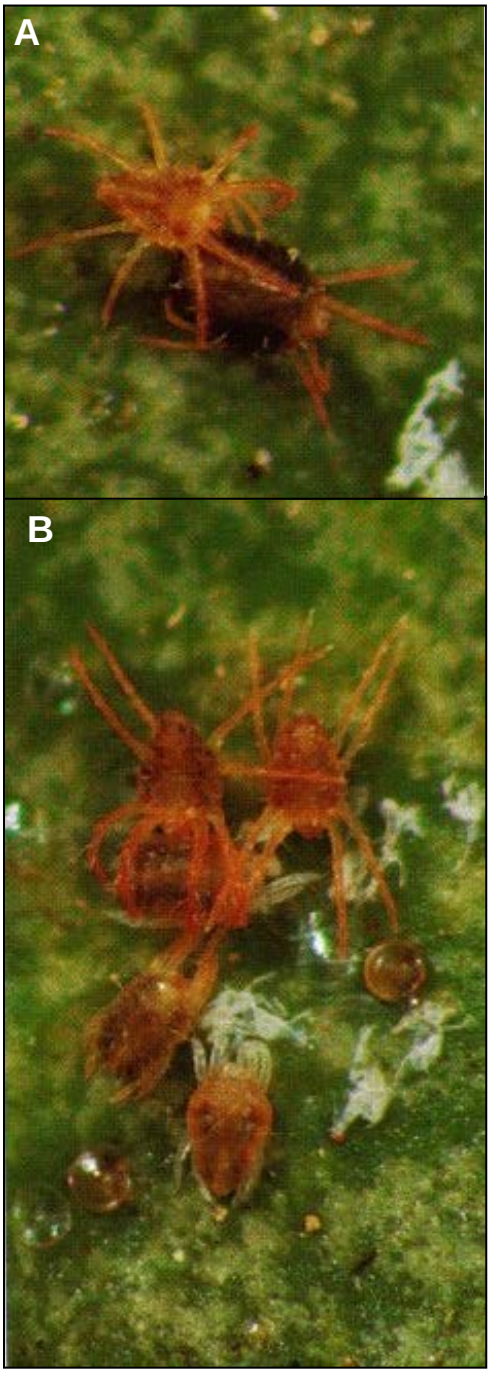

Figure 1. *E. orientalis* (A) Male on top of darker female, (B) males clustering around pre-adult female, photos courtesy of Smith et al. 1997, EPPO/CABI

Larvae: The average size of the nymph of *E. orientalis* is 190 x 120 µm. The protonymph is pale-brown to light green, with legs shorter than the body and an average size of 240 x 140 µm. The deutonymph is pale-brown to light green with an average size of 300 x 220 µm (EPPO/CABI, 1997; CAPS, 2010,).

Adults: Adult females are broad, oval, and flattened. They vary in color from pale brown through brownish-green to dark green with darker spots within the body. The legs are about as long as the body and yellow-brown (Fig. 1 & 2). The average size is 410 x 280 µm (CAPS 2010).

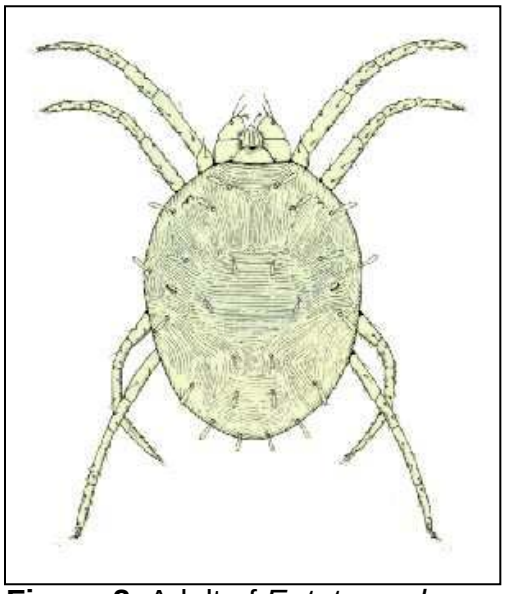

Figure 2. Adult of *Eutetranychus orientalis.* Drawing courtesy of CSIRO Entomology, Australia.

Male adults are much smaller than the females. They are elongate and triangular in shape with long legs (leg about 1.5 x body length) (CAPS, 2010). The body setae are short and cannot be observed with a 10x lens (Smith-Meyer, 1981; Dhooria and Butani, 1984; EPPO/CABI, 1997).

Technical Description: Jeppson et al. (1975) and Smith-Meyer (1987) provide diagnostic descriptions of *Eutetranychus orientalis*. *E. orientalis* has the following combination of characters: striae on the prodorsum longitudinal and tuberculated; striae between the second (d/sub/1) and third (e/sub/1) dorsocentral setae longitudinal or V-shaped; the 13 pairs of dorsal body setae all arise from basal tubercles and vary in length and shape; dorsolateral setae on the body (c2), (d2), (e2), (f2) are long, lanceolate and subspatulate or broadly spatulate; dorsocentral setae (c1), (d1), (e1), (f1), (h1) short and spatulate, lanceolate, or subspatulate; first pair of dorsocentral setae (c1), first pair of dorsal lateral setae (c2), and humeral setae (c3) all more or less in line; third (e1) and fourth (f1) dorsocentral setae form a square; terminal sensillum (spinneret) of palptarsus three times as long as broad; coxa II with one seta; tactile setal formulae (I-IV): femora 8-6-(3-4)-(1-2), genua 5-5-2-2, tibiae 9-6-6-7; chromosome number (n)=3 (CAPS, 2010).

For additional information see: EPPO/CABI (1997) http://www.eppo.org/QUARANTINE/insects/Eutetranychus_orientalis/EUTEOR_ds.pdf.

Symptoms/Signs

All active stages of *E. orientalis* feed and molt on the upper side of fully expanded leaves (Hill, 1987). On citrus, the mite starts feeding on the upper side of the leaf along the midrib and then spreads to the lateral veins. The area around the feeding site turns gray, and during infestation the entire leaf surface appears chlorotic due to a large number of gray spots (Avidov and Harpaz, 1969; EPPO/CABI, 1997; CAPS, 2010). Pale

yellow streaks develop along the midrib and veins. Little webbing is produced. In heavier infestations, the mites feed and oviposit over the whole upper surface of the leaf. Very heavy infestations on citrus cause leaf fall and dieback of branches, which may result in defoliated trees. Lower populations in dry areas can produce the same effect (EPPO/CABI, 1997; CAPS, 2010).

Survey

CAPS-Approved Method*: Visual inspection is the approved method to survey for *E. orientalis*.

*For the most up-to-date methods for survey and identification, see Approved Methods on the CAPS Resource and Collaboration Site, at http://caps.ceris.purdue.edu/.

Literature-Based Methods:

Visual survey: *E. orientalis* can be detected by discoloration of the host leaves and pale-yellow streaks along the midribs and veins. Eggs, immature stages, and adults may be observed visually on the upper leaf surface. Adult females are larger than the males. They are oval and flattened and are often pale brown through brownish-green to dark green. Webbing is possible (often dust colored), providing protection for the eggs. The mite spreads via wind, and new infestations commonly occur at field perimeters. Field perimeters should, therefore, be scouted, especially field perimeters facing prevailing winds. Studies indicate that alfalfa plays a role in dispersing tetranychid mites to other crops (Osman, 1976). Fields near alfalfa should be targeted for survey. Shake leaves above white paper or cloth, and use a hand lens to observe mites.

Surveys should be focused where the greatest risk for establishment occurs. A recent risk analysis by USDA-APHIS-PPQ-CPHST indicates that in most states in the continental United States pest establishment is unlikely. Risk for *E. orientalis* establishment based on climate and host availability is low in Arizona, California, Nevada, Texas, and Utah. Risk is low to moderate in Florida.

Hall (1992) discusses sampling strategies for spider mites in orange groves. The author's sampling method consisted of examining 16 leaves per tree, five trees within a small area of trees, and three areas per block. Leaves are collected by removing four leaves from each of the north, east, south, and west sides of a tree. Leaves are placed into separate plastic bags. The bags are placed in a cold ice chest, taken to the laboratory, and examined under a microscope to count the number of spider mites present per leaf (both surfaces).

Gilstrap and Browing (1983) recommend using a liquid sampling procedure for leaf collecting mites. Leaves are placed in a jar filled with 0.5% liquid dishwashing soap and 0.5% standard bleach (5% NaCl) (each % by volume) in distilled water. The liquid soap breaks up surface tension; the bleach dissolves any webbing. The author showed that this liquid sampling procedure collects more mites than the 'normal procedure'.
In the 'normal procedure', leaves are placed in a paper bag and a mite-brushing machine is used to dislodge mites from the samples when processed the next day.

Dhorria and Butani (1984) collected forty random leaves (10 leaves/tree) from each almond variety at different heights and all sides of the plants to assess mite resistance. A mite-brushing machine was used to dislodge the mites from the leaves on to counting disks.

Key Diagnostics/Identification

CAPS-Approved Method*: Confirmation of *E. orientalis* is by morphological identification. The mite can only be identified by examination of the adult male.

*For the most up-to-date methods for survey and identification, see Approved Methods on the CAPS Resource and Collaboration Site, at http://caps.ceris.purdue.edu/.

Literature-Based Methods: According to a NAPPO pest alert, the only form of *E. orientalis* that can be identified is the adult male. Conflicting information states that identification of *E. orientalis* requires examination of cleared and mounted female specimens by transmitted light microscopy. Mite experts agree that though it may be possible to identify a specimen with a slide mounted female, one can never be certain without a male for confirmation. *E. orientalis* can be easily mistaken for the Texas citrus mite (*E. banksii*). Similarity of the female *E. orientalis* with other tetranychid mites such as the two-spotted mite (*Tetranychus urticae*) can make identification difficult.

References

Avidov, Z., and Harpaz, I. 1969. Plant pests of Israel. Jerusalem, Israel Universities Press. 16–19.

CAPS (Cooperative Agricultural Pest Survey). 2010. Corn Commodity-based Survey Reference. Cooperative Agricultural Pest Survey.

Dhooria, M.S. and Butani, D.K. 1984. Citrus mite, *Eutetranychus orientalis* (Klein) and its control. Pesticides 18(10): 35–38.

EPPO/CABI (European and Mediterranean Plant Protection Organization/ Centre for Agriculture and Biosciences International). 1997. Quarantine Pests for Europe. 2nd edition. Edited by Smith IM, McNamara DG, Scott PR, Holderness M. CABI International, Wallingford, UK, 1425 pp. http://www.eppo.org/QUARANTINE/insects/Eutetranychus_orientalis/EUTEOR_ds.pdf.

Gilstrap, F.E. and Browing, H.W. 1983. Sampling predaceous mites associated with citrus. PR Tex. Agric. Exp. Stn. 4149.

Hall, D.G. 1992. Sampling citrus and red mites and Texas citrus mites in young orange trees. Proc. Annu. Meet. Fla. State Hort. Soc. 105: 42-46.

Hill, D.S. 1987. Agricultural insect pests of the tropics and their control. 2nd ed. Cambridge: Cambridge University Press. 498.

Jeppson, L.R., Keifer, H.H., and Baker, E.W. 1975. Mites Injurious to Economic Plants. Berkeley, USA: University of California Press.

Lal, L. 1977. Studies on the biology of the mite *Eutetranychus orientalis* (Klein)(Tetranychidae: Acarina). Entomology 2(1): 53–57.

Osman, A.A. 1976 (publ. 1980). The role of alfalfa in dispersing tetranychid mites to other crops. Bull. Soc. Ent. Egypte 60: 279-283.

Smith-Meyer, M.K.P. 1981. Mite pests of crops in southern Africa. Science Bulletin, Department of Agriculture and Fisheries, Republic of South Africa 397: 65–67.

Smith-Meyer, M.K.P. 1987. African Tetranychidae (Acari: Prostigmata) with reference to the world fauna. Entomology Memoir, Department of Agriculture and Water Supply, Republic of South Africa 69: 77–78, 80–82.