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مروری بر توزیع گسترده گونه خسارت‌زای کنه پهن (*Polyphagotarsonemus latus* (Banks)) و آفت گیاهان

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چکیده

این مقاله در ارتباط با افرادی می‌باشد که درباره کنه زرد وپهن به‌عنوان یک کنه با دامنه تغذیه وسیع و آفت مخرب با گسترش جهانی در حال تحقیق می‌باشند. آلودگی شدید آن باعث خسارت زیاد به گیاهان مختلف به‌خصوص آن‌هایی که جنبه تجاری درگلخانه دارند می‌شود. وضعیتی از بیولوژی و روش‌های کنترل آن به اختصار مورد بررسی قرارگرفته است.

واژه‌های کلیدی: کنه زرد و پهن، گیاهان میزبان، توزیع، پراکنش، خسارت، کنترل

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Useful Web sites

Fasulo, T. R. 2013. http://entnemdept.ufl.edu/creatures/orn/broad_mite.htm

Montasser, A. A. *et al*., http://www.pvamu.edu/texged

Pëna and Campbell 2005. Broad mite see Electronic Data Information Service (EDIS), University of Florida http://edis.ifas.ufl.edu/CHO20

The CABI Invasive Species Compendium gives a good list of the most important references - www.cabi.org

Dispersal.

It spreads short distances by walking over plants and sometimes longer distances by the wind. Human transport of infested plants can have an important impact on dispersal. Labanowski (1999) has identified it as a new pest of ornamental plants in commercial glasshouses in Poland, the result it is believed of international trade with other EU countries. Dispersal can also take place by attachment to insects such as aphids, thrips and white fly (Fletchmann, *et al*., 1990). This is a phenonomen known as phoresy, a loose attachment of the mite to the insect for transport purposes.

Control.

As with other cases of acarological attack, careful management and integrated control methods are the most appropriate ways of dealing with this mite problem and in this instance both biological and chemical control methods are available.

There are several predatory Phytoseid mites which are offering biological control (Pëna & Campbell, 2005), including *Amblyseius swirskii* which is a general predator (Maanen *et al*., 2010) together with a number of other predatory species including *Neoseiulus barkeri* (Fan & Petitt, 1994) and *N. californicus.* In China the release of the predatory mite *N. cucumeris* in greenhouses has led to the control of the mite on sweet pepper and in USA (Florida) greenhouses, *N. californicus* was shown to be more effective than *N. barkeri* in controlling *P. latus* on lime plants (Pëna & Osborne, 1996, see also the Cabi website, www.cabi.org).

In terms of chemical control, several miticides or acaricides are available. Insecticidal oils and soaps are less toxic to the environment than routine chemical treatment and might be as effective (Fasulo, 2013, webpage). However, care must be taken not to interfere with their natural enemies. Alternatives such as hot water treatment involving lowering the plants into hot water for 15 minutes at temperatures of 109.4 to 120.2 F (43 to 49C) can be effective (Fasulo, 2013).

A note on the figures and an acknowledgement

The life cycle stages illustrated in the figures were obtained from *Capsicum annuum* L., a pepper plant maintained in the greenhouses at the University of Leeds, Yorkshire, UK. Routine scanning electron microscope methods were used (Baker, 2012). Adrian Hick provided technical assistance with the microscopy and images and we are grateful to him for his contribution.

Distribution.

This is now worldwide and the mite is spreading. It is widely distributed in Europe, Central and Southern Africa, Australia, the Americas and in Asia. Countries where it has been recorded are documented (see CABI website). In the tropics and subtropics it breeds all the year round, and at different times in temperate climates and is a serious pest in greenhouses. The short life cycle (4-7 days) means that damaging densities can build up quickly.

Hosts.

This mite infests ornamental plants and vegetables under protected cultivation in temperate countries, and in warmer parts of the world it can be a pest in the field on plants such as citrus, cotton, jute, tea, potato and other vegetables. The CABI website gives a comprehensive list of hosts.

Host plants from over 60 plant families have been recorded (Gerson, 1992). It is a pest of cotton (*Gossypium*) in tropical Africa and Brazil; of tea (*Camellia sinensis*), chilli peppers (*Capsicum*) and aubergines (*Solanum melongena*) in China and potatoes (*Solanum tuberosum*) in Iran (Arbabi *et al*., 2001). The mite can cause extensive damage to plants, leading to qualitative and quantitative production costs in both in human labour and control.

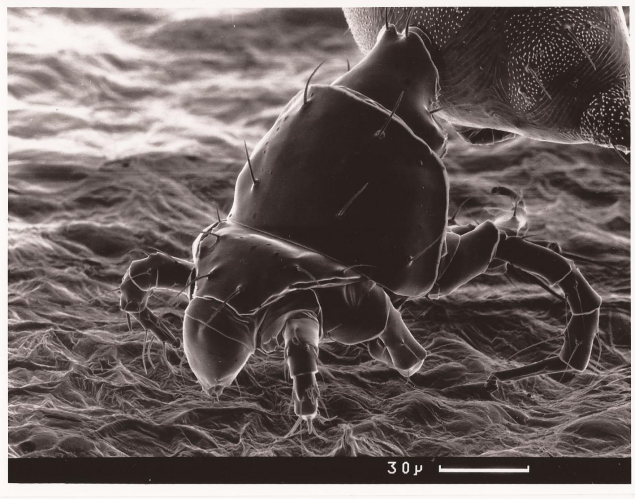
Naming after its host is frequently used as a common name for the mite so it has been called the chilli mite, citrus silver mite and has other english names. In German it is the briet-milbe or weisse milbe. In India and Sri Lanka it is the yellow jute mite, yellow tea mite. In some EU countries it is known as the broad spider.

The situation in Iran

P. latus was recorded for the first time in Iran in 2001 (Arbabi *et al*, 2001), attacking autumn potatoes, causing twisting of young terminal and lateral leaves and browning on their undersides. Higher infestations can cause decreases in growth, tuber size and crop yields. It has also been reported in Iran from tomatoes (*Solanum lycopersicum*), egg plants (*Solanum* sp.), cucumbers (*Cucumis sativus*) and strawberries (*Fragaria*), although the economic damage caused has been brought under control in Iran. Life cycle studies under controlled temperature (25±1C) and relative humidity conditions (70±10%) in Iran (Namvar & Arbabi, 2007) revealed the duration of the various life cycle stages (mean 1 day each), the longevity of males (7.9 days), females (9.8 days) and egg fecundity (mean 30.5). Six varieties of cultivated potato were examined for fluctuations in the populations of *P. latus,* their susceptibility and maximum and minimum damage. Maximum mite damage was recorded for the Arinda variety and minimum damage for the Sante variety (Namvar & Arbabi, 2007). The white fly in cucumber greenhouses in the southern part of Iran has been found as one of the sources of broad mite infestation (see section on dispersal). In Iran some organic acaricides like GC-mite, Biomite are found effective in the control of *P. latus* on infested eggplants under glasshouse conditions

Damage

Foliage curls, generally downwards, becomes bronzed and looks shrivelled or scorched, becoming darker on potatoes or purple on cotton. Apical leaves are most affected, become distorted and may die and in general terms growth is stunted.

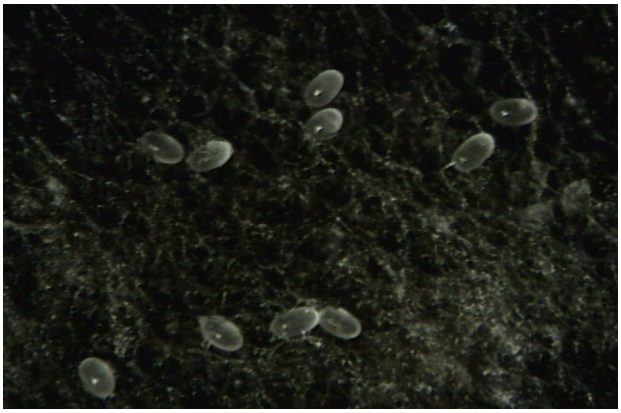


شکل ۲- حمل مرحله دئوتونمفی کنه ماده زرد و پهن توسط کنه نر

Fig. 2- Pharate female being carried by a male

شکل ۳- کنه ماده زرد و پهن

Fig. 3- Adult female mite



شکل ۴- تخم کنه زرد و پهن

Fig. 4- Eggs of Broad mite

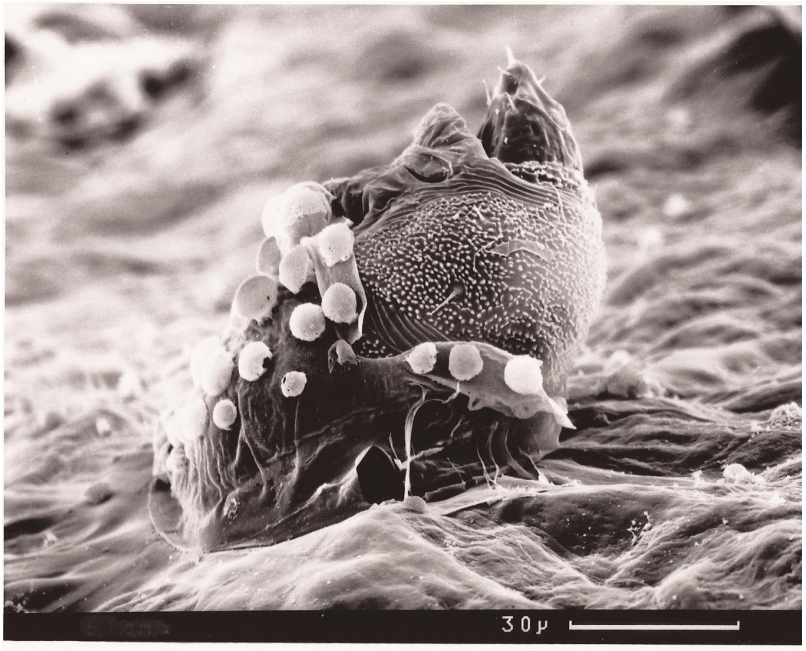
Features of the life cycle.

The egg has characteristic 'protuberances' or small whitish bumps over the surface (fig. 1). Different authors have used a variety of terms to describe these, making it confusing for the reader. Their function is thought to be that of a discontinuous plastron for gaseous exchange (Baker, 2012). The eggs hatch after one or two days giving rise to a larval stage which feeds for a day and then goes into an immobile quiescent stage. Again the terminology for the latter is confusing as this stage has been variously referred to as a diapausing larva, a pupa, or a quiescent nymph. None of these terms is not wholly appropriate and this immobile quiescent stage should preferably be called a pharate female, as the females develops inside the distended larval skin without the latter being sloughed off, that is, the new exoskeleton is still covered by the old one.

Martin (1991) and Montasser *et al* (2011) are among several recent authors who have described the life cycle and provided scanning electron micrographs (SEM).

Males carry the swollen, inactive females (fig. 2) around on a powerful posterior sucker (Baker, 2012), leading to what has been described as precopulatory male guarding, where the males are ensuring reproductive females will be available to them when the females reach sexual maturity.

The female (fig. 3) is around 200µ in size and the tibia and tarsus are fused ending in a button like claw. The male is smaller than the female and faster moving. Reproduction is Arrhenotokous (fig. 4) & there is a female biased sex ratio, females predominate - the figure is given as 4:1 by some authors but this can vary depending on external conditions.



شکل ۱- خروج لارو کنه زرد و پهن از تخم

Fig. 1- Larval stage emerging from an egg.

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The Broad mite, *Polyphagotarsonemus latus* (Banks), a résumé of a widely distributed invasive species and plants pest

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Abstract.

This paper deals with some of the current issuers involving *Polyphagotarsonemus latus* (Banks), a plant feeding invasive mite which is a destructive pest worldwide. Heavy infestations can cause serious damage to a large number of plant families especially in commercial glasshouses. Aspects of the biology will be considered including a brief reference to control measures.

Keywords: *Polyphagotarsonemus latus*, host plants, distribution, dispersal, invasive, control

Introduction.

A number of mites species are known to cause serious damage to plants in greenhouses, the most familiar being the spider mites (*Tetranychus spp.*), and also including, *Aculops lycopersici* and *Rhizoglyphus* spp. *Polyphagotarsonemus latus* belongs to the family Tarsonemidae and is a plant feeding pest with a worldwide distribution. It has a wide host range which includes aubergines, beans, citrus, cotton, cucumbers, jute, mango, peppers, potato, strawberries, tea, tomato and some medicinal plants. The article will review some of the recent literature, emphasizing, in particular, the distribution, dispersal, host plants and predators of this mite. Brief reference will also be made to control measures. The mite was first described as *Tarsonemus latus* in 1904 from the terminal buds of mango (*Mangifera indica*) in greenhouses in Washington DC, USA.

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