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The flat mite *Brevipalpus lewisi* (Acari: Tenuipalpidae) infesting the Dawn Redwood *Metasequoia glyptostroboides*

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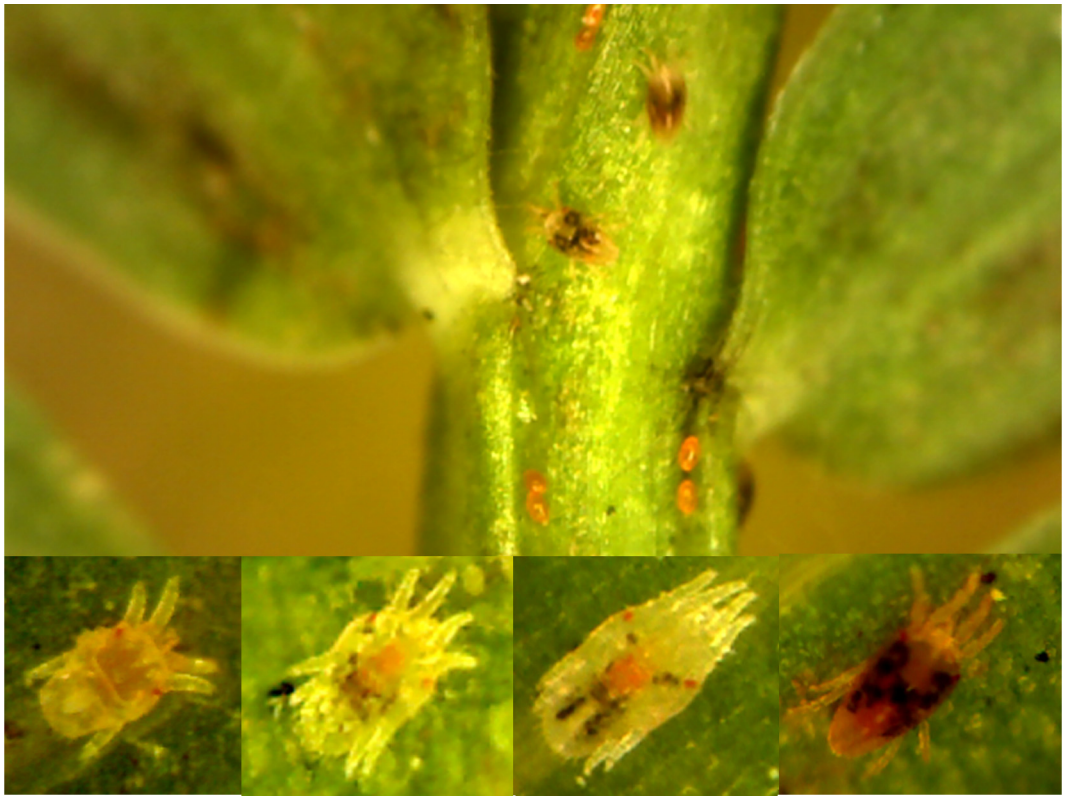

Metasequoia glyptostroboides Hu *et* Cheng, a rare deciduous conifer of the redwood family (Cupressaceae), was discovered from fossil material (Miki 1941) and formally described in scientific literature as a new, existing species in 1948 (Hu & Cheng 1948). Though with a limited natural range in western Hubei, northern Hunan and eastern Sichuan provinces in central China (Chu & Cooper 1950; Bartholomew *et al.* 1983), the species is at present planted throughout the world in botanical gardens and arboreta from as far north as Scandinavia to as far south as New Zealand (Satoh 1999). The genus *Brevipalpus* have attracted extensive attention worldwide for their involvement in vectoring plant viruses (Chagas *et al*. 2003; Childers *et al*. 2003; Kondo *et al*. 2003; Rodrigues *et al*. 2003) since their first description by E.W. Baker (1949). Among the 16 species known in China (Zhang 2010), *Brevipalpus lewisi* McGregor (Acariformes: Tenuipalpidae) is reported to be widely

distributed in China, USA, Cuba, Japan, Egypt, Mexico, Spain, and Australia (Wang *et al.* 1981; Deng *et al.* 1989; Kerns *et al.* 2004; Lewis 1949; Rodriguez *et al.* 1987), with an extensive host range of citrus (Lewis 1949; Elmer & Jeppson 1957), pomegranate (Ebeling & Pence 1949), walnuts (Michelbacher 1956), grapes (Buchanan *et al.* 1980; Arias & Nieto 1985), and pistachios (Rice & Weinberger 1981).

Brevipalpus lewisi has been known as a pest of grapes in northern China such as Liaoning, Hebei, Shandong and Henan (Wang 1981; see also the review in Zhang 2010). However, in 2009, *B. lewisi* was found for the first time infesting *M. glyptostroboides* and inflicting considerable economic damage to the cities of Shanghai, Nanjing, and Wuhan in eastern China. The symptoms observed on the infested plants were leaf spots, color change from yellowish to brownish, as well as large numbers of mites and their exuviae on the lower surfaces of leaves (Fan *et al.* 2010).

Overwintering adult female *B. lewisi* feed on the new lower leaf surface of *M. glyptostroboides* and aggregate along the mid-vein in mid-May, depositing oval reddish eggs on the petiole in four to eight clusters. The population markedly decrease during the Meiyu season (East Asian rainy season) of June and early July, but increase and disperse over the plants in late July and early August. Afterwards, the population grow quickly and reach the highest density in late September. Finally, in late November, the adult female mites overwinter in the leaf sheath of current-year and one-year-old twigs. Premlinary observations suggest *B. lewisi* developmental rates are strongly influenced by the environmental conditions, especially temperature and rainfall. Dry and low-rainfall make the mites most virulent, leading to the outbreak period from August to October.

The cover image shows four active stages of *B. lewisi* growth: larva, protonymph, deutonymph, and adult. A physiologically active resting period exists between each active stage. The female adult is usually rufous amber in color with black pigmentation, while immature flat mites are slight red. *B. lewisi* reproduce by thelytokous parthenogenesis (Buchanan *et al.*1980), with females producing females and no males were found. Reference specimens are deposited in the Entomology Specimen Room of Nanjing Forestry University, and some specimens were also in Institute of Zoology, Chinese Academy of Sciences, Beijing.

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