

Mini data sheet on *Megacopta cribraria* (Hemiptera: Plataspidae)
kudzu bug or bean plataspid

Added to the EPPO Alert List in 2014 - Deleted in 2018

Reasons for deletion:

Megacopta cribraria has been included in EPPO Alert List for more than 3 years and during this period no particular international action was requested by the EPPO member countries. In 2018-06, the Working Party on Phytosanitary Regulations agreed that it could be deleted, considering that sufficient alert has been given.

Why: *Megacopta cribraria* has recently been introduced into the USA. It was first found near Atlanta (Georgia) in autumn 2009 and it rapidly spread to several states in Southeastern USA, clearly demonstrating an invasive behaviour. Damage to soybean crops has been reported in parts of the invaded area in the USA. Finally, *M. cribraria* is a nuisance pest, as this stink bug gathers in huge numbers in houses or other structures, seeking shelters in autumn.

Where: *M. cribraria* originates from Asia.

EPPO region: Absent.

Asia: China (Anhui, Aomen (Macau), Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Shandong, Shanghai, Shanxi, Sichuan, Tianjin, Xianggang (Hong Kong), Xizhang, Yunnan, Zhejiang), India (Andhra Pradesh, Assam, Karnataka, Madhya Pradesh, Orissa), Indonesia (Java, Sumatra), Japan (Honshu, Kyushu, Ryukyu, Shikoku), Korea (Dem. People's Republic of), Korea (Republic of), Malaysia (West), Myanmar, Pakistan, Sri Lanka, Taiwan, Thailand.

North America: USA (Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, South Carolina, Tennessee, Virginia).

In Japan, many records refer to *M. punctatissima* which has been considered by several authors as a distinct species. However, phylogenetic studies have indicated that *M. cribraria* and *M. punctatissima* are not distinct but represent local populations of the same species, although with considerable genetic and phenotypic diversity. In addition, these studies have strongly suggested that the invasive *M. cribraria* populations found in the USA derived from a '*M. punctatissima* population' from Kyushu (Japan). In addition, the endosymbionts detected in the *M. cribraria* populations from the USA are also found in the Japanese populations. All these results suggest a Japanese origin for the US populations.

On which plants: In the USA, *M. cribraria* primarily feeds on kudzu (*Pueraria montana* var. *lobata* - EPPO A2 List) which is an invasive plant, and on soybean (*Glycine max*). According to the literature, other leguminous plants can be attacked, such as *Cajanus cajan* (pigeon pea), *Lablab purpureus* (lablab), *Sesbania bispinosa* (= *S. aculeata*), *Vigna radiata* (mung bean). However, for some of these crops, it is not entirely clear whether the insect can complete its life cycle on them. *M. cribraria* harbours the obligate bacterial endosymbionts, '*Candidatus* Ishikawaella capsulata' and *Wolbachia*, in its midgut which allows it to feed on legumes. These endosymbionts synthesize essential amino acids and other nutrients that are not provided by the plant food source.

Damage: *M. cribraria* is a piercing-sucking insect, larva (nymphs) and adults feed on tender stems, petioles and leaves. Heavy populations can result in some defoliation and development of sooty mold. On soybean, the combination of stem and foliar damage, and reduced photosynthesis from sooty mold leads to improperly developed pods, undersized

seeds and eventually yield losses. In Southern USA, it is estimated that in 2012 the infested area was 366 000 acres (148 000 ha) of which 61 100 acres (24 700 ha) were treated against *M. cribraria*. Field data collected from trials in Georgia and South Carolina had indicated an average yield loss of 18% (ranging from 0 to 47%) in unprotected soybean crops. Although, *M. cribraria* feeds voraciously on kudzu, it is not known if this feeding activity will effectively reduce populations of this invasive plant in the USA. *M. cribraria* is clearly a nuisance to homeowners because as autumn approaches, they leave their feeding sites (often nearby kudzu patches) and congregate in huge numbers on houses (usually on the sunlit Southern and Eastern exposures). In addition, this bug emits an unpleasant smell when disturbed, produces a yellow substance when crushed that can stain cloth, wood and other surfaces. Finally, *M. cribraria* has been in some cases reported to cause painful skin irritation.

Biology: Studies carried out in the USA on have shown that *M. cribraria* eggs were most commonly found on the tender leaf sheath of the growing vine tips of kudzu (a few also found on the underside of older leaves). Eggs are usually laid in groups of 2 parallel rows (on average, 15-18 eggs per egg-mass). Eggs are oval in shape (approximately 0.8 mm long and 0.4 mm wide), white at the beginning but rapidly turning off-white to salmon pink. The operculum is round and surrounded by short spine-like projections. *M. cribraria* undergoes 5 larval instars (nymphs). Adults are somewhat square in shape (approximately 4-6 mm long and 3.5 mm wide), olive-green with a brown mottle. *M. cribraria* overwinters as adults. In the USA, 2 generations per year were observed, but in China up to 3 generations can take place. In the USA, it has been observed that the first generation developed on kudzu and then migrated to soybean crops to complete the second generation. *M. cribraria* can tolerate cold (it overwintered in north Georgia where there were days when temperatures fell below zero between 2009 and 2010).

Dissemination: Adults are active and strong fliers, and they readily fly when disturbed. In addition, *M. cribraria* is a hitchhiker, it has been observed flying and landing on people, as well as on and in their vehicles. Dead specimens have also been intercepted by South American countries in containers containing meat products from the USA.

Pathway: more information would be needed to understand how trade can move *M. cribraria*, but it seems that this insect easily moves as a hitchhiker on many different types of products which are not necessarily associated with plants.

Possible risks: Although countries of the EPPO region are not among the main world producers, soybean is of economic importance. Other leguminous crops, such as beans (*Phaseolus* spp.) are widely grown in the EPPO region but their host status for *M. cribraria* still needs to be clarified. Unlike in the USA, kudzu which is a major host of the pest, is of very limited distribution in the EPPO region and this might be a limiting factor for the establishment and spread of the pest if it were introduced into the EPPO region. As the pest seems to be able to be transported as a hitchhiker, this may complicate its detection in trade. Control methods against *M. cribraria* are available. Efficacy data from trials conducted in Georgia and South Carolina have indicated that several insecticides could provide an effective control in soybean crops. The use of biocontrol agents is also envisaged [e.g. *Dirphys boswelli* (Hymenoptera: Aphelinidae), *Paratelenomus saccharalis* (Hymenoptera: Platygasteridae), *Strongygaster triangulifera* (Diptera: Tachinidae)]. Considering the invasive behaviour of *M. cribraria*, the nuisance it can cause in private homes, and the potential damage it may cause to leguminous crops, it is desirable to avoid its introduction into the EPPO region.

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