EPPO Datasheet: *Xylotrechus namanganensis*

Last updated: 2023-07-27

IDENTITY

Preferred name: *Xylotrechus namanganensis*
Authority: (Heyden)
Taxonomic position: Animalia: Arthropoda: Hexapoda: Insecta: Coleoptera: Cerambycidae
Other scientific names: *Clytus bucharensis* Semenov, *Clytus namaganensis* Heyden, *Turanoclytus namanganensis* (Heyden), *Xylotrechus namaganensis* (Heyden), *Xylotrechus subcrucifer* Pic
Common names: Namangan longhorn beetle, willow longhorn beetle
view more common names online...
EPPO Categorization: A2 list
view more categorizations online...
EPPO Code: XYLONM


more photos...

Notes on taxonomy and nomenclature

The species name relates to the Namangan valley of Uzbekistan, which forms an enclave between Kyrgyzstan and Tajikistan.

HOSTS

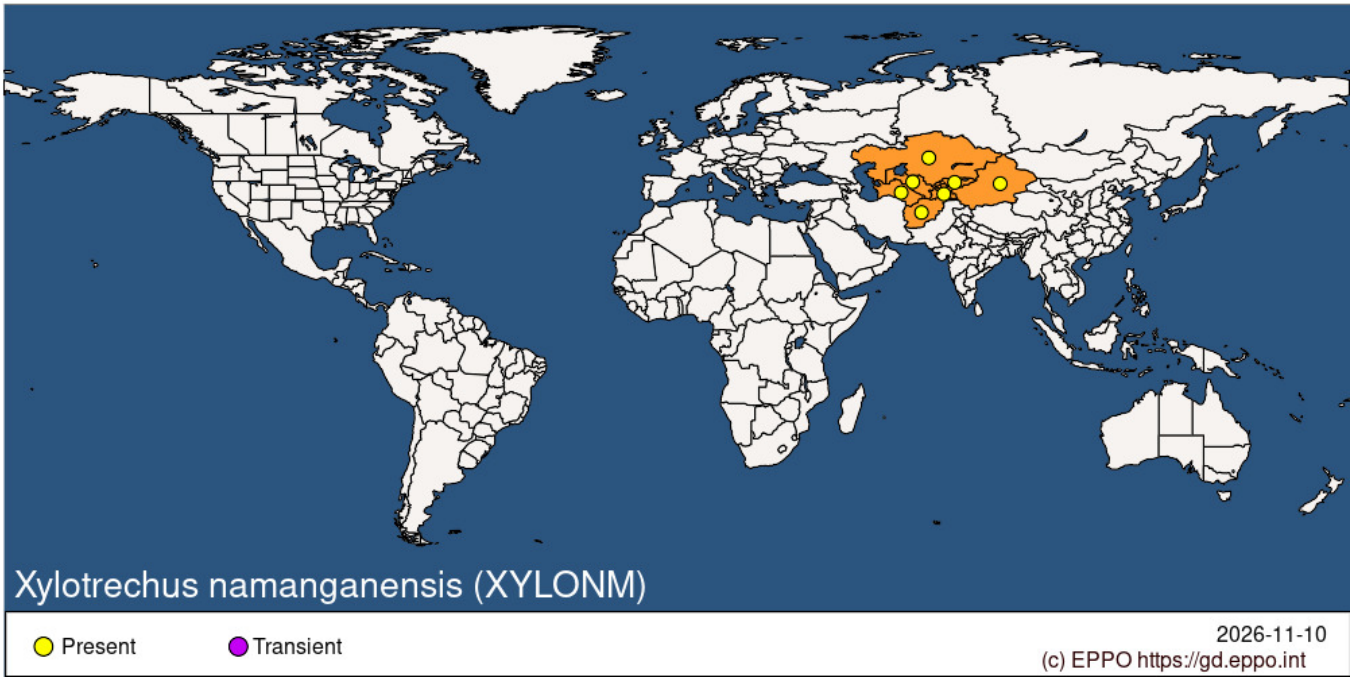
Xylotrechus namanganensis is a wood boring pest of many broadleaved trees in riparian forests, city parks and orchards. The host list of this polyphagous beetle comprises woody species from different families and orders: Cannabaceae, Moraceae, Rosaceae, Ulmaceae, Elaeagnaceae (Rosales), Salicaceae (Malpighiales), Betulaceae, Juglandaceae, Fagaceae (Fagales) and Platanaceae (Proteales). It attacks many ornamental and forest trees (*Populus* spp., *Ulmus* spp., *Salix* spp., *Celtis australis*, *Elaeagnus angustifolia*, *Platanus hispanica*, *Alnus glutinosa*) and various fruit and nut trees (*Juglans regia*, *Malus domestica*, *Morus nigra*, *M. alba*, *Prunus armeniaca*, *P. avium*, *P. dulcis*) that are of economic importance (Pavlovskii & Shtakelberg, 1955; Makhnovskii, 1955, 1966; Romanenko, 1981; Kadyrov, 1988; Magni & Caudullo, 2016; Wang *et al.*, 2000; Wang, 2001; EPPO, 2005; Yan *et al.*, 2022). Recent studies on natural habitats reveal that this cerambycid is one of the most important pests of the riparian forests in Central Asia infesting *Populus euphratica* (= *P. diversifolia*), *P. alba* and *Salix alba* (Kostin, 1973; Ishkov & Kadyrbekov, 2004; Shoev, 2011; Kadyrbekov & Tleppaeva, 2015; Borissova, 2018; Tleppaeva *et al.*, 2017; Kadyrbekov & Tleppaeva, 2019; Shoev *et al*., 2021; Kalandarov, 2022). In Xinjiang, China, this species has also demonstrated some host plant specificity and did not attack a number of species (non-hosts): *Acer ginnala*, *Catalpa ovata*, *Fraxinus bungeana*, *Fraxinus chinensis* var. *rhynchophylla*, *Malus prunifolia*, *Prunus armeniaca*, *Prunus davidiana*, *Prunus salicina*, *Prunus triloba*, *Salix babylonica*, *Salix gmelinii*, *Syringa oblata*, *Tamarix chinensis*, *Ulmus densa*, *Ulmus pumila*, *Vitis vinifera* (Wang, 2001).

Host list: *Alnus glutinosa*, *Betula*, *Celtis australis*, *Crataegus*, *Elaeagnus angustifolia*, *Juglans regia*, *Malus domestica*, *Morus alba*, *Morus nigra*, *Platanus x hispanica*, *Populus alba*, *Populus euphratica*, *Populus nigra*, *Populus x xiaohei*, *Prunus armeniaca*, *Prunus avium*, *Prunus dulcis*, *Salix alba*, *Salix babylonica*, *Ulmus davidiana var. japonica*, *Ulmus laevis*, *Ulmus minor*, *Ulmus pumila*

GEOGRAPHICAL DISTRIBUTION

Xylotrechus namanganensis is native to Central Asia. It inhabits plains and mountain areas at altitudes up to 2600 m a.s.l. The species is most common in arid riparian forests within its range of distribution. It is abundant and dominant

within the longicorn fauna in southern parts of Kazakhstan and the north-west of China. *X. namanganensis* is also widespread in Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan (Pavlovskii & Shtakelberg, 1955; Makhnovskii, 1955, 1966; Kostin, 1973; Romanenko, 1981; Vorobjev, 1986; Kadyrov, 1988; Wang *et al*., 1999; Wang, 2001; Ishkov & Kadyrbekov, 2004; Kadyrbekov & Tleppaeva, 2015; Tleppaeva *et al.*, 2017; Kadyrbekov & Tleppaeva, 2019; Lazarev, 2019; Kadyrov *et al.*, 2016; Marupov *et al.*, 2021; Shoev *et al.*, 2021; Kalandarov, 2022; Yakubov & Esanbayev, 2022).



EPPO Region: Kazakhstan, Kyrgyzstan, Uzbekistan
Asia: Afghanistan, China (Xinjiang), Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan

BIOLOGY

Xylotrechus namanganensis completes its life cycle in one or two years, depending on climatic conditions. The flight period is long: adults can be found from April to August, with mass emergence in May, June and July. Beetles can be most easily detected on the bark of mature trees (living or fallen trunks and thick branches), especially on warm and sunny days. They can be also easily observed while feeding on sap of host plants as well as on nectar of Apiaceae (*Ferula*, *Heracleum*, etc.). Adults of *X. namanganensis* prefer to run over the substrate than to fly. Females usually do not fly higher than 2 m, and the host plants are infested at a height of 0?2 m. Adults copulate on flowers and trunks. Females lay eggs in cracks in the bark of trunks and, sometimes, of thick branches, preferring weakened mature trees (10 years old or older). They usually lay eggs about 10 times a day and 3?5 eggs each time; one female may lay from 50 to almost 200 eggs during her lifetime (Wang, 2001). Larvae emerge 13–16 days later. The larvae enter the bark and make a small hole underneath it, then a longitudinal gallery situated both in the bark and sapwood. Larvae of medium age enter deeper into the wood (3 to 5 cm) and make longitudinal and transverse galleries filled with thin borings. They usually overwinter as mature larvae and pupate in spring (Pavlovskii & Shtakelberg, 1955; Makhnovskii, 1955, 1966; Kadyrov, 1988; Wang *et al*., 1999; Tleppaeva *et al.*, 2017; Marupov, 2021; Wang, 2001).

A number of natural enemies have been reported for the different life stages of *X. namanganensis*: an ant *Lepisiota rothneyi* (Formicidae), a carnivorous thrips *Aeolothrips fasciatus* (Aeolothripidae), the parasitoid wasps *Leluthia* sp., *Aspicolpus erythrogaster* and *Zombrus sjostedti* (Braconidae), the checkered beetle *Trichodes spectabilis* (Cleridae) and the bark-gnawing beetle *Melambia tekkensis* (Trogossitidae), the fungi *Beauveria bassiana*, *Fusarium solani*, *Aspergillus candidus*, and also birds of the genus *Dendrocopos* (Vorobjev, 1986; Wang, 2001; Lelej, 2012).

DETECTION AND IDENTIFICATION

Symptoms

Adults of *X. namanganensis* can be found on trunks and thick branches of trees. They tend to stay on host plants after emergence, while feeding on sap and during the copulation or oviposition process. Infested wood is characterized by the presence of numerous oval emergence holes 4?8 mm wide and 6?8 mm high. Sapwood infested by *X. namanganensis* contains characteristic larval galleries of wavy shape, gradually widening and 3?5 cm deep. Eggs, larvae of all ages, and pupae can be found in the living wood, but the identification of species based on preimaginal stages is not yet possible because their morphology remains poorly studied. Infested plants show the usual symptoms that are caused by trunk boring pests: tree dieback starts with wilting and drying of the upper leaves, continuing with the drying of branches and may result in complete death of a tree in less than two years (Sinadskii, 1963; Tleppaeva *et al.*, 2017).

Morphology

Egg

No detailed information has been published for this species. Similar to the eggs of other species of the genus *Xylotrechus* (Cherepanov, 1988), the eggs of *X. namanganensis* are expected to be whitish, oblong, narrower at posterior pole and about 2 mm long (extrapolation of egg size is based on correspondence with adults' body size).

Larva

The species has 6 larval instars (Wang, 2001). The morphology of larva has not been fully described yet. Nevertheless, Danilevsky (1979) noted that larva of *X. namanganensis* can be differentiated from other species of the genus by the microscopic chaetae present only on the thoracic locomotory ampulae (in contrast to *X. arvicola* which have no chaetae on locomotory ampulae, or to *X. asellus*, *X. hircus. X. pantherinus*, *X. altaicus* which have an abdominal locomotory ampullae partially covered with chaetae, or to *X. rusticus* which is characterized by a locomotory ampullae fully covered by chaetae).

Pupa

No detailed information has been published for this species. However, the exarate pupae of the genus *Xylotrechus* can be identified by the following combination of characters: antennae flexed to sides, with apices directed backward; abdominal tergite I with well-developed spinules; paired medial spinules on abdominal tergites distinctly larger than other spinules (Cherepanov, 1988).

Adult

Adults of *X. namanganensis* are 10–25 mm long (females are somewhat bigger than males). The body is brown to black, except for legs and antennae which are yellowish to brown. The lateral part of pronotum, epipleurae and ventral side of the body is covered with dense whitish setae. The species can be differentiated by the following features: elytra are widened apically and rounded basally; elytra bear three pairs of evident whitish spots that may slightly vary in shape and size; pronotum is finely punctured; frontal carinae are sharp, but short; antennae are short, reaching only the first third or the middle of the elytra in male, and even shorter in female; apical antennal segments are thin and third antennomere is shortened; first segment of hind tarsus is as long as, or even longer than combined length of segments 2?5 (Plavilshchikov, 1940; Makhnovskii, 1955, 1966; Danilevsky, 1979).

Detection and inspection methods

Visual detection and rearing of adults

The visual examination of living trees and wood is essential for the detection of *X. namanganensis*. The trunk of trees with early signs of dieback (dry leaves or branches) should be checked for presence of adult beetles. They can hide in the cracks or run on the surface of the bark. Beetles found should be captured for closer examination under a microscope or magnifying glass. Wood can be visually inspected for the presence of emergence holes of specific

shape and size. Moreover, debarked wood can be inspected to reveal the presence of larval galleries characteristic for *X. namanganensis* (see Symptoms). The larvae found in the wood can be preliminary differentiated by the chaetotaxy of the locomotory ampullae, but the rearing of adults or molecular methods should be further used to confirm the identification. It is also essential to rear adults from pupae, if any are found in the wood. The rearing method is based on the use of cotton bags that are large enough to contain the piece of wood and are firmly closed. The bags containing wood infested by larvae and/or pupae should be left in conditions close to natural ones (with sufficient gas exchange and normal humidity). Regular checks should be made to detect the presence of beetles as soon as they emerge. Only adult specimens, captured on host plants or reared from larvae or pupae, can confirm the presence of the pest, while larvae and symptoms seen on the trees and wood can only serve as additional evidence.

Molecular

The molecular identification can be used for all developmental stages of *X. namanganensis* because its mitochondrial genome has been completely sequenced (available in GenBank). It is 15 565 bp long and consists of 13 protein-encoding genes, 22 tRNA-encoding genes, 2 rRNA-encoding genes and 1D-loop control region. The base composition of the mitochondrial genome is biased in favour of the A+T content (73.21%). The phylogenetic tree based on complete mitogenome sequences revealed that this species is most closely related to *X. grayii* (Yan *et al*., 2022).

PATHWAYS FOR MOVEMENT

Adults of *X. namanganensis* naturally fly, but prefer to run and seek for host trees within neighbouring areas. They are likely to be transported over long distances as contaminating pests of plant products or untreated wood: beetles tend to hide in bark cracks and can therefore be present on host plants sold for planting, decoration or building purposes. Because larvae and pupae of *X. namanganensis* live inside the sapwood and are therefore difficult to detect, they may easily be transported with untreated wood or wood packaging moving in trade.

PEST SIGNIFICANCE

Economic impact

Xylotrechus namanganensis is an important pest of deciduous forest, ornamental and fruit trees in its native range (Central Asia), especially of *Populus* and *Salix* spp. in riparian woodlands, *Elaeagnus* spp. in shelterbelts, fruit trees in valleys, and ornamental plants in urban areas. This cerambycid belongs to the group of wood borers, which are the most damaging forestry pests (compared to other groups of pests e.g. leafcutters). *X. namanganensis* is considered to be one of most harmful forest pests in Central Asia. In urban landscapes, it significantly damages large deciduous trees that are of particular amenity value in dry and hot climate conditions and that are difficult to replace. In Uzbekistan and Kazakhstan, it has also proved to be one of the main pests of natural woodlands, and its negative impact on urban plantations has been estimated to be considerable (Makhnovskii, 1955, 1966; Tleppaeva *et al.*, 2017; Borissova, 2018; Kalandarov, 2022; Yakubov & Esanbayev, 2022).

Xylotrechus namanganensis attacks both stressed and healthy trees of different ages, as well as cut trees and wood with bark. When a single tree is attacked by a significant number of insects, it may die within 1 or 2 years. The concentration of the pest is usually very high, 5–10 emergence holes per 10 dm^2 of the bark, and the economic injury level was estimated by Wang *et al*. (1999) as 2 emergence holes per plant. This species prefers to attack mature trees and, even in cases when it does not kill them, infestation results in significant delays for sprouting, advanced leaf shedding, loss of vigour and of wood marketability (because of dense and large galleries made by the larger larvae deep in the wood) (Plavilshchikov, 1940; Arkhangel'skii, 1941; Pavlovskii & Shtakelberg, 1955; Grechkin, 1956; Makhnovskii, 1955, 1966; Matessova *et al*., 1962; Sinadskii, 1963; Yagdyev, 1975; Romanenko, 1981; Krivosheina & Tokgaev, 1985; Kadyrov, 1988; Wang *et al*., 1999; EPPO, 2005).

Control

Common control efforts are undertaken in countries where *X. namanganensis* currently occurs. Monitoring and general faunistic surveys provide essential information of the presence, distribution and abundance of the pest.

Control measures are undertaken based on survey results and include measures, such as burning of infested plants for planting, removal and destruction (burning or grinding) of heavily infested trees, preventive cutting of trees weakened by other pests in forests, orchards and urban parks, removal of bark from logs and newly fallen trees which are present in the habitats and can be attacked by the pest, burning of wood remains left after timber cutting, treatments with chemical and biological insecticides. These measures aim to reduce the pest population density of the pest, avoid outbreaks, and prevent its spread into adjacent territories (Makhnovskii, 1955, 1966; Wang *et al*., 1999).

A number of preventive measures can be applied in the pest-free areas to minimize the chances of incursion for *X. namanganensis*. Regular pruning of trees performed in spring and autumn are considered to be important. Measures applied against other pests or diseases can also prevent further infestation of host plants with *X. namanganensis*. Chemical treatments of trees in urban parks and streets in April?May are also considered as appropriate preventive measures (Shoev *et al.,* 2021; Yakubov & Esanbayev, 2022).

So far, no biological agents have been reported as used against *X. namanganensis*, and no traps or chemical attractants are known to be applied against this pest. However, as pheromone traps and biological control agents have been successfully used against other cerambycid pests and therefore should be considered as potentially of use for this species (Liu *et al*., 1992; Wang, 2001; Cao *et al.*, 2015). Among the known enemies of this beetle (see Biology) the wasps of the family Braconidae are of special interest as potential biocontrol agents: to date *Aspicolpus erythrogaster* is the only a specific parasitoid known for *X. namanganensis*, while *Zombrus sjostedti* can develop on many species of Cerambycidae and several Bostrichidae (Wang, 2001; Chen & Achterberg, 2018). Finally, trunk injections with conventional insecticides have successfully been applied to control a closely related species, *X. chinensis*, and therefore could potentially be used against *X. namanganensis* (Kavallieratos *et al*., 2022).

Xylotrechus namanganensis is known to attack weakened trees such as those previously infested by other pests, dehydrated or damaged. Thus, the measures supporting good health and strength of trees can prevent infestation with this pest (e.g. adequate watering, fertilizing of soil, preventive treatments with insecticides and fungicides). Regular preventive pruning of weakened trees is important for maintaining the health of urban plantations and can minimize the need for chemical treatments (Shoev *et al.*, 2021; Kalandarov, 2022).

Phytosanitary risk

Xylotrechus namanganensis is considered to be a very serious pest of forest, ornamental and fruit trees in its native range of distribution. This species prefers dry and hot climates, inhabits valley and mountain areas, therefore could be easily introduced into Mediterranean countries of the EPPO region (especially in the south). The wide range of host plants which occur all over Mediterranean area make the risk of introduction very high. The main phytosanitary risk arises from the movement of mature plants for planting, untreated dunnage and wood packaging. The hidden way of life of *X. namanganensis* at preimaginal stages considerably increases this risk: the eggs are rather small and hidden in the bark cracks, the larvae develop in the sapwood and cannot not be visually detected unless the wood is debarked, the pupae are sealed deep in the wood, easily detectable emergence holes appear only after the exit and spread of adults.

PHYTOSANITARY MEASURES

It can be recommended that plants for planting and wood of host plants of *X. namanganensis* originating from countries where the pest occurs should be submitted to border inspection and should originate from an area free from the pest. In addition, it may be required that plants for planting should be dormant, without leaves or plant debris, transported in safe conditions (e.g. outside the insect flight period, in closed containers). Wood of the host plants should be debarked, free from grub-holes, kiln-dried, or subject to an appropriate treatment (EPPO 2003a, b; EPPO 2017a,b,c,d,e; EPPO, 2020a,b; EPPO, 2022). Wood packaging material should respect ISPM no. 15 (FAO 2018).

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Datasheet history

This datasheet was first published in the EPPO Bulletin in 2005 and revised in 2023. It is now maintained in an electronic format in the EPPO Global Database. The sections on 'Identity', ‘Hosts’, and 'Geographical distribution' are automatically updated from the database. For other sections, the date of last revision is indicated on the right.

EPPO (2005) *Xylotrechus namanganensis*. Datasheets on pests recommended for regulation. *EPPO Bulletin* **35**(3), 456–458. https://doi.org/10.1111/j.1365-2338.2005.00860.x

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