IMPACT OF THE ELM LONGHORN BEETLE ON ORNAMENTAL ULMUS TREES IN THE KHOREZM OASIS

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Abstract. The ornamental elm (genus Ulmus) has long been valued in Central Asian landscaping for shade and aesthetic appeal. In the Khorezm Oasis of Uzbekistan, species such as the hardy Siberian elm (Ulmus pumila) are widely planted in cities and farms. However, these elm trees are under threat from the elm longhorn beetle (a wood-boring cerambycid). Larvae of this pest tunnel through trunk and branch wood, disrupting the tree's water transport system and causing crown dieback. In Khorezm's hot, arid climate, environmental stress further weakens trees and amplifies damage. This paper reviews the beetle's biology, the symptoms and extent of elm damage observed in Khorezm, and recommends integrated control strategies. Results indicate that a combination of monitoring, sanitation, chemical treatment, and biological methods is needed to protect ornamental elms from decline.

Keywords: Elm longhorn beetle; Ulmus; Ornamental trees; Khorezm oasis; Pest management

Introduction. Ornamental elm trees (genus Ulmus) are common shade and street trees throughout Central Asia, prized for their broad canopy and rapid growth. In Uzbekistan's Khorezm region, hardy elm species such as Siberian elm (Ulmus pumila) and other local Ulmus have been extensively planted in parks, avenues, and windbreaks. These trees help to mitigate the intense summer heat and serve as wind buffers in the irrigated oasis landscape. However, elm trees face increasing pest pressures. Of particular concern is the elm longhorn beetle – a type of cerambycid borer – that has recently been documented attacking Ulmus in Khorezm. This pest poses a new challenge in the region's semi-arid environment, where stressed trees may be especially vulnerable to infestation. The present work examines the biology of the elm longhorn beetle, characterizes the damage it causes to elm trees, assesses its regional impact in Khorezm, and outlines practical control methods to protect these valuable ornamental trees [1].

Biology of the Elm Longhorn Beetle. The elm longhorn beetle is a member of the Cerambycidae family, commonly known as longhorn beetles due to their

characteristically long antennae. Adults are typically large (often several centimeters in length) and may exhibit distinct coloration or patterns (for example, mottled grays, browns or orangish markings) that help identify them in the field. Females lay eggs in cracks or crevices of elm bark or in pruning wounds. Each female can lay dozens of eggs over her lifespan. After the eggs hatch, the legless larvae bore into the tree's wood, feeding on the inner bark (phloem) and sapwood (xylem). The larvae create long, winding tunnels (galleries) as they grow, consuming the living tissues that transport sap. Larval development generally spans one to two years. In Central Asia's continental climate, the beetle often has a two-year life cycle: larvae develop over the summer and then pupate by late summer, remaining as pupae through winter within the wood. Adults emerge the following spring or early summer, chewing round exit holes through the bark to exit the tree. The adults are active fliers from late spring through summer months, when they may feed briefly on foliage or bark, although adult feeding is minor compared to larval damage [2]. These beetles are generally attracted to weakened or stressed trees; healthy, vigorously growing elms can often resist infestation better than drought- or disease-weakened trees.

Damage to Elm Trees. The primary impact of the elm longhorn beetle comes from the feeding activity of its larvae inside the wood of elm trees. As larvae tunnel through the trunk and main branches, they sever the phloem and xylem tissues that transport water and nutrients. Over time, this tunneling can girdle branches or even the main stem, causing sudden wilting and dieback of the branches above the damage. Infested trees often show symptoms of decline such as yellowing or browning leaves, sparse foliage, and reduced growth. Bark over infested areas may crack or blister as sap flows out around the feeding sites. Larvae expel frass (a mixture of wood particles and waste) which may accumulate at the base of the tree or along the bark.

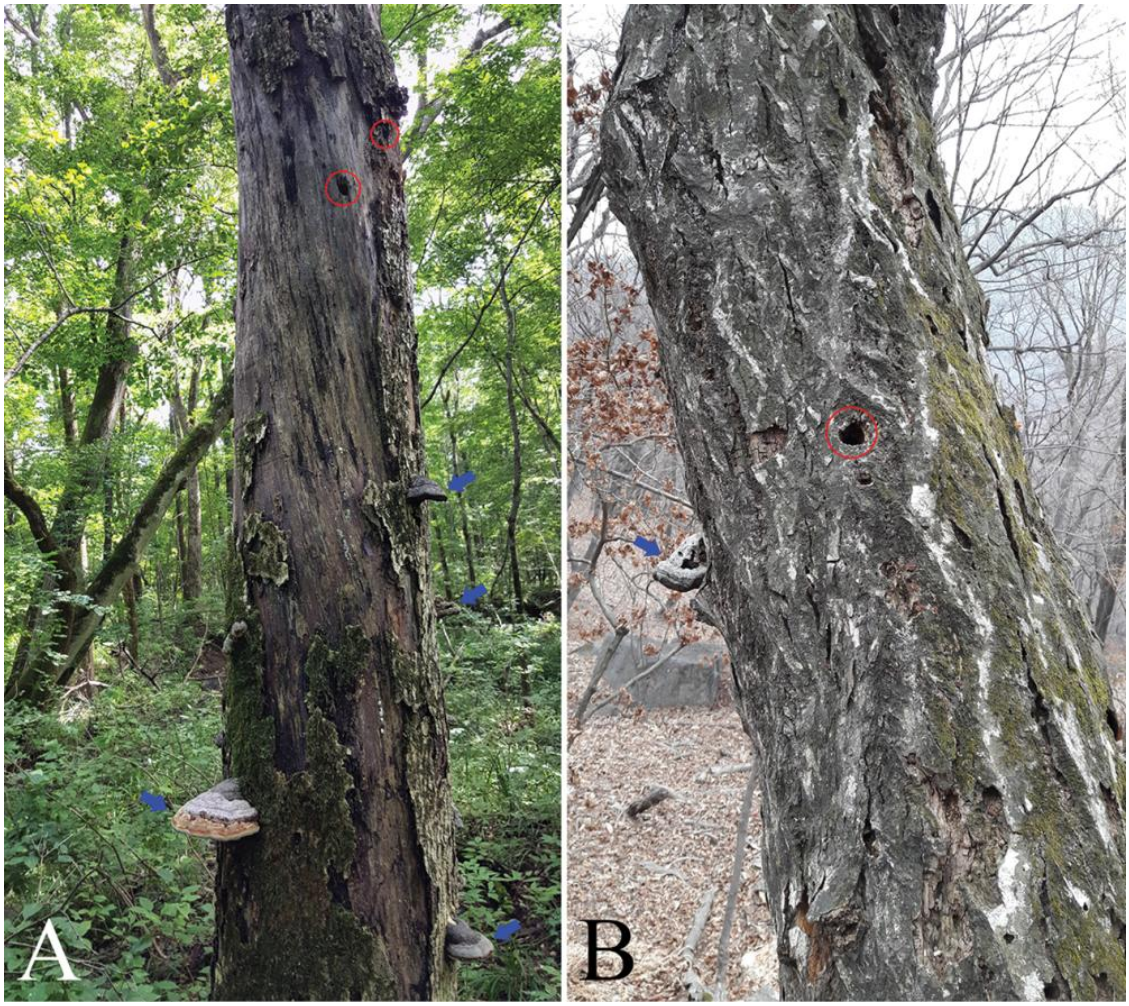


Image-1.

The characteristic emergence holes left by adult longhorn beetles are a clear sign of infestation in elm trunks [3]. These round exit holes (shown circled in the image) are typically 5–10 mm in diameter. Each hole represents where a mature larva transformed into an adult and chewed its way out of the wood. Often the surrounding wood shows signs of decay, and secondary wood-decay fungi (visible as shelf-like brackets or discoloration in the image) may colonize the damaged tissue. The presence of many exit holes, along with sawdust-like frass, usually indicates a heavy infestation. In ornamental settings, even a few such holes can be cause for concern, as they indicate internal damage that can weaken the tree structurally and aesthetically.

Regional Context: Khorezm Oasis. The Khorezm Oasis is an irrigated lowland region in northwestern Uzbekistan along the lower Amu Darya River. It has a continental arid climate with very hot summers (often exceeding 40 °C) and low annual rainfall (generally under 100 mm). Groundwater and irrigation support most vegetation in this oasis landscape. Trees are planted along canals, roads, and farm boundaries to provide shade, wind protection, and fuelwood. Among these, elm (Ulmus) species are prominent. The Siberian elm (Ulmus

pumila L., locally called “kayragoch”) is widely used because of its fast growth and tolerance of poor soils.

Despite irrigation, many trees in Khorezm endure stress due to saline soils, uneven watering, and temperature extremes. Under these conditions, elm trees can become physiologically weak, making them susceptible to pest attack. Recent field observations in Khorezm have documented widespread infestation of ornamental elms by the longhorn beetle [4]. It has been noted that older, established elms along roads and canals often bear numerous exit holes and larval damage, whereas young saplings often remain uninfested for years. For example, surveys have found that in heavily affected groves, a large fraction (on the order of tens of percent) of mature elms showed evidence of beetle attack, especially if the trees were not well irrigated. Because these trees serve as important shade and windbreaks in the oasis, such damage has significant local impact. The longhorn beetle in Khorezm appears to be polyphagous (feeding on multiple tree species), but elms are among its preferred hosts. Notably, weakened or drought-stressed elms are disproportionately targeted: trees in poor health, or older trees with thin bark, are frequently infested, while healthier, vigorously growing elms often withstand initial attacks. This pattern highlights the interplay of pest pressure and site conditions in Khorezm’s elm decline.

Conclusion and Control Strategies. The elm longhorn beetle poses a serious threat to Khorezm’s ornamental elm population. Left unchecked, continued infestations can lead to widespread dieback of elm windbreaks and street trees, reducing the region’s green cover and landscape value. To protect Ulmus trees in Khorezm, an integrated pest management approach is required. Key strategies include:

Monitoring and early detection: Regular scouting of elm trees for symptoms (dying shoots, wood dust or frass, exit holes) allows managers to identify infestations before extensive damage occurs. Trapping adults with pheromone or light traps during the flight season may assist in early warning [5].

Cultural and sanitary controls: Prompt removal and destruction of infested wood is critical. Dead or heavily infested branches and trees should be cut and burned or chipped to kill overwintering larvae. Maintaining good irrigation and reducing tree stress will make elms less attractive to the beetle. Pruning should be done outside of peak beetle emergence periods to avoid exposing fresh wounds.

Chemical treatments: For high-value trees, systemic insecticides (applied via trunk injection or soil drench) can protect trees by killing developing larvae.

Treatments should be timed so that insecticide is active during the period when eggs are hatching and young larvae begin feeding under the bark. Insecticidal sprays on bark cracks may also prevent egg-laying on accessible surfaces. Care must be taken to follow safety guidelines and minimize impact on non-target organisms.

Biological control: Encourage natural enemies. Woodpeckers and other birds can prey on larvae under the bark. Parasitic wasps that target cerambycid larvae may contribute some control. Experimental use of entomopathogenic nematodes or fungal pathogens in infested wood has been suggested in similar systems and could be explored in Khorezm. Planting a diversity of tree species rather than monocultures of elm may reduce pest buildup.

Regulatory measures: Restrict movement of untreated elm firewood and timber from infested areas. Public education campaigns can inform residents not to transport beetle-infested wood. Quarantine zones may be considered if an invasive population is expanding [6].

Ultimately, preserving Khorezm's elm trees will require sustained effort. The combination of tree stress in the hot, arid climate and the highly damaging beetle life cycle means that vigilance is necessary. By combining monitoring, removal of infested material, targeted insecticide use, biological agents, and public awareness, local managers can significantly reduce the impact of the elm longhorn beetle. A coordinated management program implemented by urban foresters and farmers alike can help ensure that the region's valuable ornamental elms continue to thrive.

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