

**ORNAMENTAL CLIMBER *Tecoma radicans* A. L. Juss.
PROBLEMS AND CONTROL**

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An important ornamental climber, grown in small enclosed areas with low intensity of maintenance, is turning into a weed species in urban gardens. In Belgrade area, there are several locations where the species *Tecoma radicans* A. L. Juss. has spread to the extent of violating some elements of the surrounding garden and facilities, including even roads. When the main purpose of a plant species is lost, such as in this case is the ornamental purpose, and the species has assumed the character of a weed, its control becomes necessary and it sometimes needs to be removed.

Key words: *Tecoma radicans*, landscape architecture, horticulture, garden weeds, wood anatomy, control

INTRODUCTION

Gardens constitute a very important element of public greenery in towns and settlements in general. In some places, gardens are the only existing forms of greenery.

Vertical landscaping is mostly applied in gardens and much less frequently in streets, parks or other forms of public greenery. Vertical landscaping includes the greening of pergolas, walls, terraces, balconies, roofs, etc. This form of greenery, however, is quite specific as the development of plants used in vertical landscaping and the condition of their growth are often very unfavourable and difficult. Vertical landscaping is mostly applied in places where it is not possible to grow conventional greenery, i.e. in areas that are bounded, narrow or otherwise

unsuitable for establishing a sufficient volume of greenery. Plant species applied in vertical landscaping are mostly climbers. The reasons for using climbers in vertical landscaping are numerous: they grow fast, branch well, have intensive shoot vigour, it is possible to direct their growth, they climb by adhesive habit with or without additional support, they grip vertical structures or vertical elements and tolerate pruning. Climbers, characterized also by attractive flowers and fruits, long flowering periods and ornamental foliage throughout the growing period, including autumn, are therefore considered adequate for vertical landscaping.

Tecoma radicans A. L. Juss. (Fam. *Bignoniaceae*; Syn. *Capsis radicans*), a very popular ornamental climber in gardens of Serbia, is used in landscaping vertical structures, pergolas, columns, walls and hedges (fig. 1). It is mostly planted alone or in combination with other climbers, such as wisteria (*Wisteria sinensis* Nutt.), or used in landscaping fences with species like ivy (*Hedera helix* L.), honeysuckle (*Lonicera caprifolium* L.), etc.

The species' natural habitats are wet forests, more or less swampy sites of the eastern parts of North America. It is grown as an ornamental species throughout the world (VUKIČEVIĆ, 1987).

Tecoma is mostly used to cover pergolas, walls and balconies. The species (fig. 2) can reach the height (length) of up to 15 m (VUKIČEVIĆ, 1987) as it holds to its support by aerial roots. Decorative character of this species is reflected in its monumental growth, compound imparipinnate leaves and most importantly in its flowers, usually red or orange in colour. Abundant flowering and long flowering periods, from July to September, are additional reasons why this climber is one of the most popular species in vertical landscaping of gardens, as well as in urban public greenery in general.

In urban conditions, the species *Tecoma radicans* thrives. In nurseries, it is mostly propagated by seed, layering, grafting or cuttings.

Under unfavourable conditions of growth and development, i.e. in small spaces or lacking proper maintenance, this highly decorative climber may partly or completely lose its major function, which is to improve the appearance of human environment and make it more enjoyable.

MATERIAL AND METHOD

In the territory of Belgrade, we found several locations where the species *Tecoma radicans* has developed to the extent of spoiling some garden elements or structures, or even roads. The behaviour of this plant species in green areas had been monitored and analysed for several years in the past. At certain sites, the species has retained its original ornamental feature while at the same time damaging the wall used for support, e.g. the elementary school "Josip Pančić", Banovo Brdo. In a private garden at Vračar, Mlade Bosne Street, *tecoma* has invaded the pergola and loaded and overtopped the wooden fence. Using its root suckers, it has spread to other parts of the garden, neighbouring yards and the nearby road. In Pančevo

suburbs, the species has overtopped a pergola and damaged the roof of the building it was decorating.

Based on an analysis of vertical landscaping in Belgrade, we have concluded that this otherwise ornamental climber may turn into a weed when its decorative function is lost and the species should then be controlled.

Controlling tecoma in gardens could be a problem as the species has extraordinary shoot vigour. It spreads throughout the garden area and is most often intertwined with other plants that need not to be eliminated. The species was controlled mechanically and treated with the herbicide sulfosate (product Touch-down 4-LC). Treatment included foliar application and the coating of the upper stump section with some herbicide.

In preparation of a more detailed study of the species *Tecoma radicans* and with the intention of examining the justifiability of control methods, anatomical sections of the plant stem were cut up. The felled tecoma trees were cut into 20-mm thick disks from which specimens were selected, suitable for cutting cross, radial and tangential sections by a sliding microtome. The thickness of cross sections was 17 μm . Franklin's reagent for maceration (30% H_2O_2 and 96% CH_3COOH , scale 1:1) was dosed onto wood pieces cut up to matchstick size and placed in glass tubes stopped with corks and left in a thermostat for 24^h. By dissolving the intercellular substance, we obtained individual cells that could be used in anatomical analysis. It enabled a detailed analysis of forms and sizes of cells found in tecoma wood.



Fig 1. *Tecoma radicans* in ledge



Fig. 2 Stem of tecoma



Fig. 3 Effect of foliar



Fig. 4 Mortified tecoma in flower bed

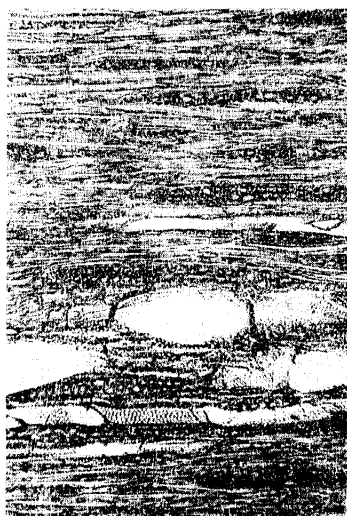


Fig. 6 Tangential section of tecoma tree

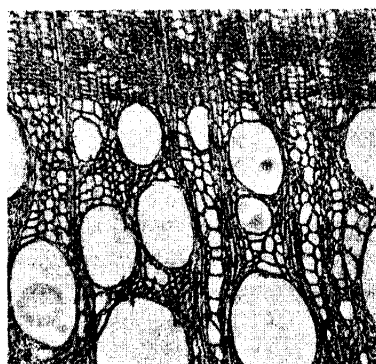


Fig. 5 Cross section of tecoma tree

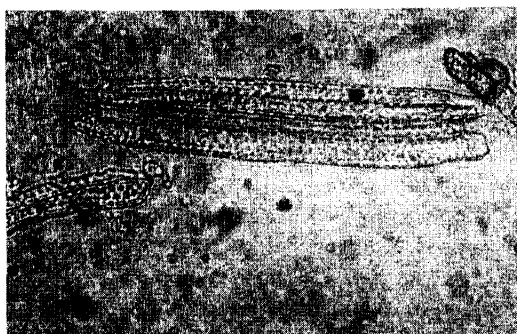


Fig. 7 Single vessel element of tecoma tree

RESULTS AND DISCUSSION

The climber *Tecoma radicans* grows and develops very well in the region of Serbia. It is very decorative and thriving at all sites where its growth and development were examined. It has no special requirement regarding soil quality, grows well in conditions of temperate continental climate and tolerates polluted urban environments. At some locations, however, we found this species to be highly aggressive, invasive and competitive against other plant species composing the local greenery.

By irregular and inadequate maintenance, this plant species and the majority of other ornamentals lose to some extent or completely their ornamental character. At locations where branch pruning and cutting down shoots and suckers had been a regular practice, tecoma growth was controlled and guided correctly in a desired direction. By regular and correct pruning, we stimulate flowering and simultaneously reduce the weight on the supports (wooden or metal pergolas, columns, walls, cables, etc.) that hold up the aboveground organs of this plant species. Frequently, however, measures of maintenance by pruning are being neglected, despite the fact that this form of damage caused by climbers in green areas is comparatively the least harmful and quite easy to solve simply by pruning.

In the yard of the elementary school "Josip Pančić", *Tecoma radicans* has damaged a large area of the façade. In 1995, the tree was felled and removed from the building façade. The remaining stump was not treated. Over the following five years, the plant developed again with many stump shoots and suckers near the stump, throughout the lawn.

A group of nine tecoma trees were monitored at Vračar, where nine-year old trees have topped the fence and suppressed other plant species in their vicinity. The crown of a birch tree (*Betula pendula*) has been deformed, the lowest branches of an Atlas cedar (*Cedrus atlantica*) irregularly arranged and the lawn area of 30 m² intensively invaded by tecoma root suckers. Root suckers were found in flowerbeds, spoiling their composition and generally posing a threat to the garden. Root suckers were also observed in neighbouring yards. The invasion of these suckers was very intensive in 1999-2000 in the neighbouring yards as well as on a section of pavement and road in Mlade Bosne street.

At the mentioned locations, this otherwise decorative climber has harmed the appearance of local greenery, endangering neighbouring structures, roads and other plant species. Regular pruning may prevent its development in undesired directions, but the problem of root suckers is not a simple one to solve.

At the Vračar location, which is a private property and we had been allowed to examine it, we undertook tecoma control by measures of suppression. Over the 1997-1998 period, growth control, i.e. the suppression of root suckers, was performed by mechanical weeding, i.e. by rooting out suckers from flowerbeds and the lawn. However, root suckers regenerated over a very short period of time and in much greater number than before weeding. In 1999, we removed root cuttings

together with root parts from the lawn where the suckers appeared and regenerated the lawn by sawing. The aim of lawn regeneration was to improve its visual and functional characteristics (STAVRETOVIĆ, 1999) but also to achieve full coverage of the lawn, which makes the growth of other plant species difficult. However, this method of mechanical control of tecoma root sucker growth was unsuccessful and in the following spring the species reinvaded the entire lawn area.

As the mechanical removal of root suckers proved unsuccessful, at the end of September 2000 we carried out tecoma control by the herbicide sulfosate. Foliar treatment with a 2% solution of the product Touch-down 4-LC was only partially efficient. The foliage was affected for the most part but the remaining leaves were still green. Good results were achieved by treating stumps with a 20% solution of the preparation. The stumps were treated immediately after tree cutting and signs of root sucker damage were observed as early as in the following few days. The fact that satisfactory results were achieved, that herbicide application is very simple and that other plants are not endangered by such treatment make stump treatment a recommendable method.

Aiming to deepen our insight into this climber species, we analysed its anatomical structure in order to clarify the reasons of such an efficient destruction of tecoma and its root suckers (which were often up to 3-7 metres away from the tree) by treatment of the stump surface area with chemicals (in this case, sulfosate).

An analysis of macerated material showed the following anatomical elements: tracheary elements were composed of broader and shorter parts of the early zone vessels with notably wide tails and considerably narrower parts of the late zone vessels with densely arranged wall pitting and spiral thickening in the form of ridges protruding in the lumen of the vessels, which increases vessel rigidity and facilitates water conduction. Texture elements represented in tecoma have a typical structure of wood fibres, radial parenchyma consists of multiseriate homocellular rays, and the wood of this species contains cells of axial parenchyma. The observed anatomical elements point to the anatomical structure of broadleaves. Based on the maceration method, it may be concluded that *Tecoma radicans* belongs to broadleaved species. The cross section of the analysed species shows a ring porous structure of broadleaves, with coarse vessels of the early zone and narrower vessels of the late zone arranged in tangential series.

CONCLUSION

– Under unfavourable conditions, overgrown plants of *Tecoma radicans* may become a threat to other elements of urban area. In that case, we treat them as weeds and undertake their removal in order to create optimal conditions for the green areas and other elements of urban environment.

– Destruction of tecoma root suckers by mechanical means did not produce desired results.

– Foliar treatment with 2% solution of the product Touch-down 4-LC was partially efficient.

– Treatment of the stump section area with 20% solution of the same preparation produced good results. The felled plants and root suckers growing at a distance of up to seven metres were successfully eliminated without destroying any other flowering plant or the lawn.

– The destruction of root cuttings distant from the point of herbicide application (stump) is enabled by specific vascular elements, vessels forming in spring with notably wide lumens and marked spiral thickenings in internal walls. As the role of spiral thickenings of vessels is to speed up water transport, their presence makes this species suitable for treatment with chemical herbicides.

– Adequate, regular and timely maintenance of green surfaces and knowledge of the established plants' properties ensure a lasting function of such greenery.

– The employment of skilled professionals in planning, establishing and maintaining green areas can alleviate or fully settle the multiple problems arising from amateur or unprofessional dealing.

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**DEKORATIVNA PUZAVICA *Tecoma radicans* A. L. Juss.
PROBLEMI I SUZBIJANJE**

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I z v o d

Značajna dekorativna puzavica u uslovima malih prostora i niskog intenziteta nege postaje korov u vrtovima i baštama urbanih prostora. Na teritoriji grada Beograda konstatovano je više lokacija na kojima se vrsta *Tecoma radicans* A. L. Juss. razvila u toj meri da narušava pojedine elemente vrtova ili objekte pa čak i saobraćajnice. Kada biljna vrsta gubi svoju osnovnu ulogu, u ovom slučaju dekorativnu, postaje korov, nastaje potreba za njenom kontrolom u specifičnim slučajevima uklanjanjem. Na analiziranim lokalitetima tekoma je suzbijana mehaničkim i hemiskim sredstvima. Folijarno tretiranje 2%-nim rastvorom preparata Touch-down 4-LC pokazalo se delimično efikasnim. Kao efikasna metoda suzbijanja korenovih izdanaka pokazalo se premazivanje površine preseka (panja) 20%-nim rastvorom pomenutog preparata. Uništavanje korenovih reznica koje su udaljene od mesta primene herbicida (na panju) kod ove vrste je omogućeno specifičnim provodnim elementima, trahejama obrazovanim u proleće, izrazito širokih lumena i izraženih spiralnih zadebljanja na unutrašnjim zidovima. Kako je uloga spiralnih zadebljanja traheja povećanje brzine protoka vode, to je ova vrsta pogodna za tretiranje hemijskim sredstvima u cilju njenog suzbijanja. Pravilna, redovna i pravovremena nega zelenih površina kao i angažovanje stručnjaka umanjuje ili anulira probleme koje amaterski, nestručni rad prouzrokuje.

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