AFRICAN BOXTHORN

Lycium ferocissimum

Year 9/10 Agriculture

MET School CONDOBOLIN

LOCATION

The African Boxthorn is located on the bank of the Lachlan River, Condobolin NSW, in a block adjacent to the MET School, Condobolin campus.

Below is a map depicting the location in relation to MET Condobolin.

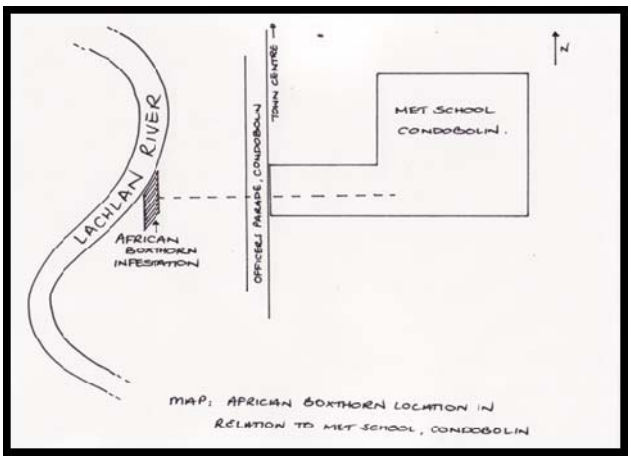


Photo: African Boxthorn, Lachlan River, Condobolin

Topography
River Bank
School block (adjacent) – sloping north-east

Soil Type
Clay loam
pH 5.5 – 6.0

Vegetation

River bank is predominantly vegetated by grasses, both summer and winter varieties.

- Perennial Rye grass
- Phalaris
- Kangaroo grass
- Spear grass
- Couch

Surrounding areas include various eucalyptus tree species.

- River Red Gum
- Yellow Box

Due to urban location of weed, other species (human introduced) are also present.

- Lantana
- Buffalo grass
- Kikuyu grass

IDENTIFICATION

Common Name: African Boxthorn

Scientific Name: *Lycium ferocissimum*

Family: Solanaceae
Other plant species belonging to this family include tomatoes and potatoes.

Origin: Native of South Africa
Introduced in Tasmania in the 1840's, commonly used as a hedge plant.
In the mid 1800's it was widely propagated and sold by nurseries, its weed impacts were apparent in the 1900's and declared noxious in many areas.

Now a serious weed threat in all States of Australia, declared a noxious weed in most parts of New South Wales.

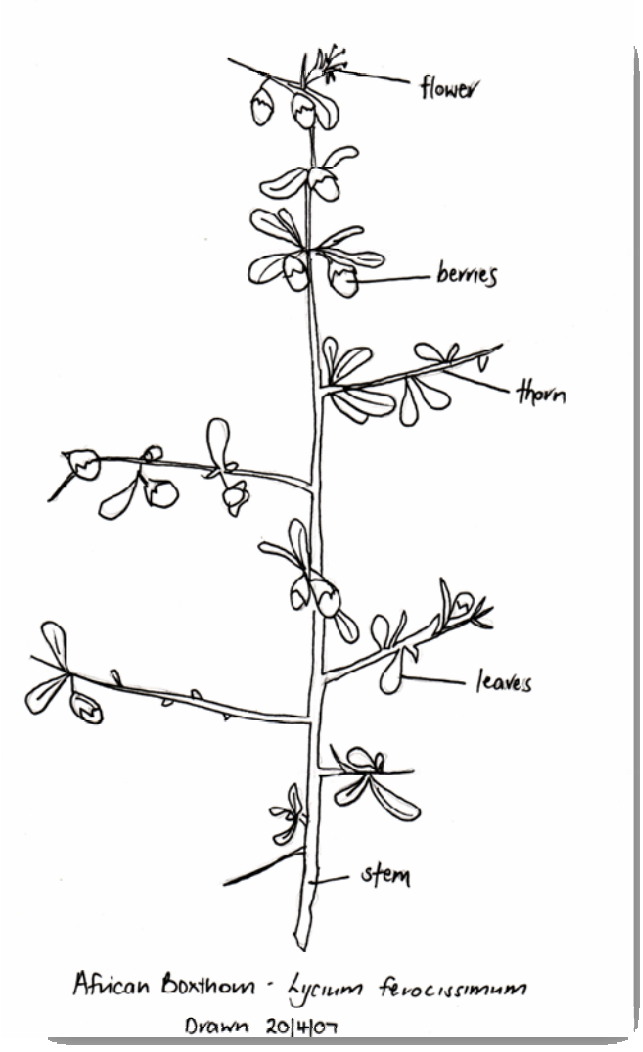
Flowers/Seed heads: Flowers singly or in pairs, white with purplish throat, 5 petals, fragrant. Flowers mostly through the summer (Oct-March) but some flowering through the year.

Lifecycle:

Fruit: Oblong berry. Ripens from a smooth green appearance to bright orange-red. Contains numerous small, oval, flattened seeds.

http://www.northwestweeds.nsw.gov.au/images/AB fruit and thorns LT small.jpg

Description: African Boxthorn is a woody shrub reaching up to 5m in height and 3 m in diameter (usually 2-3m in height). Characterised by woody, thorny growth. Stems are rigid and very branched, with the main stem having spines up to 15cm long. Leaves are smooth and fleshy. Forms an extensive root system with a large branched taproot.



Sketch: African Boxthorn, showing detail of berries, flowers, spines, stem

Dispersal: Spread by seed. Fruit commonly eaten by birds and foxes and viable seeds excreted. Can form dense stands as a result of animals feeding in and near fruiting boxthorns. Infestations commonly found under trees, along fences and under power lines (animal excretion). Has the ability to grow from root segments. Can also be transported through mud etc on farm vehicles and machinery.

Photo: African Boxthorn, Lachlan River, Condobolin.
Picture shows the large and dense form of the mature plants, African Boxthorn

IMPACT OF AFRICAN BOXTHORN

Overall Impacts of African Boxthorn

- African Boxthorn is an aggressive invader of pastures, roadsides, remnant bushlands and waterways. Rapid seed dispersal.
- Reduces access to the above areas
- Difficulty in stock movement
- Spines – cause injury to animals, humans, machinery
- Spines – protect the plant from grazing animals, allowing the plant to grow unchecked over large areas.
- Decreases viable farming land (area)
- Management – time, money, energy (human and machinery, associated costs)
- Noxious weed

Photo: African Boxthorn in large thickets (www.northwestweeds.com.au)

Immediate Impacts of African Boxthorn at Study Location (Lachlan River, Condobolin)

- Reduces viable area on the river bank (takes up an area of approx. 3m -3m)
- Limits access to the river, animals and community members
- Reduces the aesthetic value of the river bank (how it looks)
- Competes with native flora

- Rapid seed dispersal, especially in riparian environment.

MANAGEMENT PLAN

The following are management plans which could be used in a number of different situations. The following strategies are overall strategies and do not necessarily apply to the current weed study area (the most appropriate strategy is discussed in the following section).

The effective, long-term control of this weed will generally require the integration of a number of techniques, including physical control, chemical control and also replacement with appropriate plants and regular monitoring.

Physical Control

Physical removal using heavy machinery (tractor, bulldozer, bobcat, grader) is the most cost effective way of controlling mature plants (which are often large, dense thickets). Top growth should be removed as well as any root material (if possible). Removed material should be destroyed (burnt) as dead branches still pose a problem because of their thorns, dead plants can provide shelter for various feral animals, unripened fruit still has the potential to produce seed, and also broken root fragments are able to sucker and produce new growth.

Cultivation can be used after physical removal of the mature plants. By deep ripping the effected areas, root fragments can be bought to the surface, where raking and burning the fragments will potentially decrease suckers and new growth. Establishment of vigorous pastures / crops will provide competition to future suckers, reducing available water, nutrients and space.

Chemical Control

A variety of herbicides and various herbicides application methods are available for the chemical control of African Boxthorn (note: only registered herbicides should be used according to label directions).
After the application of any herbicide, the African Boxthorn often losses it's leaves and quickly appears to have died, but later new leaves appear and the plant appears to be recovering. If left unchecked, the plant can regenerate quickly. It is important that plants are monitored and follow up applications are made if required.

Foliar Application Common herbicides used include glyphosate, triclopyr and triclopyr/picloram mixtures. For effective control, the whole bush must be sprayed during a time when the plant is actively growing (not hot, dry conditions).
Care must be taken as non-target plants can be harmed (glyphosate). Picloram in particular remains active in the soil for extended periods and may potentially leach to groundwater. Care should always be taken when applying chemicals.

Basal treatment This technique is appropriate for infestations in environmental sensitive areas. It is suited to smaller plants (base-5cm). Mixture of Triclopyr and diesel should be painted around the base of the plant.

Cut Stump Treatment Also appropriate for small infestations in sensitive areas. The plant should be cut at the base and then painted immediately with chemical mixture (as above). If the herbicide mixture is not applied immediately, the plant will heal the cut, and the chemical will not be translocated through the plant.

Shotgun Treatment Herbicide Hexazinone can be applied to the soil or injected into the soil underneath the bush. Hexazinone remains active in the soil which could potentially harm other plants and leach to groundwater (great care needs to be taken with this method)

According to NSW DPI's excellent booklet *"Noxious and Environmental Weed Control Handbook 2004/2005"*, treatments for African boxthorn include:

Chemical options	Rate: Spot/Boom	Comments
Triclopyr +Picloram Grazon DS®	500 ml in 100 L of water	Apply when bushes have good leaf cover, growth and no leaf fall
Triclopyr + Picloram Access ®	1.0 L in 60 L of diesel	Apply as basal bark/cut stump application
Picloram +2,4 -D Tordon 75D ®	1.3 L in 100 L of water	Small bushes only. Spray soil to drip line. Thorough coverage is essential
Glyphosate 360 g/L Various trade names including Roundup Biactive®	700 ml to 1.0 L in 100 L of water	Low rate on young bushes, high rate on mature bushes. Thorough coverage is essential.
Triclopyr Garlon 600â	1.0L in 30L of diesel	Cut stump /basal bark application
Tebuthiuron Graslan®	2 g per square metre	Estimate the area within 30 cm beyond the drip line of the target plant - calculate the amount of Graslan required to cover the area and distribute evenly in this area. Do not apply near desirable trees.
Hexazinone Velpar L®	4 ml per spot	Bushes up to 3m tall. 1 spot per metre of height. Do not apply near desirable trees.

Replacement with Appropriate Plants

African Boxthorn seedlings are susceptible to competition from other plants. Once removed, suitable vegetation should be planted to help control the boxthorn.

Native Vegetation- in places where the infestation of African Boxthorn is providing valuable habitat for fauna, a stage control program should be used, where the weeds are removed gradually and replaced with suitable plants.

Pastures- Perennial pastures have the ability to provide competition for areas which have been removed of Boxthorns (especially areas which have used physical control methods).

MANAGEMENT PLAN TO BE USED IN THE CURRENT WEED SITUATION – LACHLAN RIVER, CONDOBOLIN.

As with all weed control strategies, it is important to chose the most appropriate management plan for not only the targeted weed, but also for other non target flora and fauna species, and the surrounding area of the weed.

In the current situation the following should be noted.

- Small infestation of African Boxthorn
- Small plant size of African Boxthorn (approximately 1.5m x 1m)
- Non target plant species in close proximity, including native grasses, gum trees, and other shrubbery
- Sensitive area – Lachlan River
- Soil type – sand, potential for any herbicides to run off target

Based on the above, the following management strategy is the most appropriate to be used in this situation.

- Physical control of the small infestation of African Boxthorn, using a small bobcat (or similar) is the most appropriate strategy.
- All material removed from the area should be burnt (at another location).
- All roots should also be discarded. Machinery should be used to dig as far down as possible and remaining root fragments discarded by hand.
- Chemical control is not an option. Lachlan River is sensitive area, herbicides should not be used in close proximity to water (contamination). The soil around the weed area is sand, which could lead to leaching, affecting non target plant species. Spray drift could potentially affect other non target plant species.

- Plant replacement. After the African Boxthorn has been removed the area should be planted with similar plant species as in surrounding areas. Plant species which could be planted include gum trees (similar to surrounding trees), native shrubs, and perennial grasses.
- Constant monitoring. The area needs to be monitored after weed control. New shoots and regrowth should be pulled out by hand (or similar method), to prevent new infestations from occurring.

MERITS OF THE STRATEGY (To be used)

The above outlined strategy to be used on the African Boxthorn infested area, is the only strategy which can be implemented. The location of the weed infestation, Lachlan River, determines the management used. Chemical control is not an option due to the sensitive nature of the immediate river, and also the number of plant species which could be harmed during any foliar application of herbicide. Replacement of plants is also another important aspect of the overall strategy. Due to the location of the weed infestation and the use of the river by both community members and different species of fauna, it is important to replace flora around the river, for
continued habitat locations and shelter.

Photo: African Boxthorn, Lachlan River, Condobolin
In this photo, the Lachlan River is highly visible showing the closeness of the weed to the river itself, making chemical control unusable in this situation

How will the strategy improve the area

- Remove unsightly weed infestation from river bank, enhancing the aesthetic quality of the river
- Enhance surrounding environment
- Encourage native flora/fauna by removing noxious weed and replacing with native species or better adapted species
- Improve access to the river for both animals and community members.
- Increase available river bank

Longevity of Strategy

- Continued management is needed of the weed area. Although the African Boxthorn has been removed and new plants introduced, all regrowth needs to be dealt with as soon as possible. With continued management the area should remain Boxthorn free.
- New seedlings can be generated from seeds left on the ground, birds and foxes from other areas introducing seeds, and mud/gravel contaminated with seeds
- Important to be able to identify young seedlings of the African Boxthorn

Predicted Problems with the Strategy

- There are no predicted problems with this strategy. There is enough room on the site to get machinery in (physical control), and there are also residents along the river bank which could continue to monitor the area.

Positive / Negative with the Strategy

- Negative – constant monitoring will be needed after weed removal. Although the majority of the weed will be removed there is a chance that new growth will generate from roots and also a chance of new seeds being deposited into the area.
- Positive – physical control methods can be used, cutting the need for the use of any herbicides. Important not to use herbicides in this area because of the sensitivity of the river and surrounding area.

The improvement to the river bank will be a great POSITIVE. The bank of the Lachlan River will be easier to access for both members of the community and animals using the river, the river will appear more aesthetically pleasing. The Lachlan River will also be free of African Boxthorn, replaced with native trees and plant species, improving the overall look and uses of the river for all members of the Condobolin community to enjoy and benefit from.

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REFERENCES

- African Boxthorn Factsheet. Department of Primary Industries and Water, Tasmania
- African Boxthorn Agfacts. Department of Primary Industries, New South Wales
- http://www.northwestweeds.nsw.gov.au/african_boxthorn.htm
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