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The Harmful Impact Effect of Wild Climbing Plants in Jazan Region, KSA

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Abstract: ***The present study aims to focus on the harmful impact effect of wild climbing plants in Jazan region, KSA. There are different species belong to different families. The harmful impact effects includeimpacts on biodiversity, recreation,building and structures and service cabinet outdoor. The suggested control measures to solve the impact problem are discussed. They are mechanical, biological, chemical and natural control. The information provided in this study points to the need for broad monitoring for wild climbing plants and continuous control research should be given top priority.***

Keywords: Climbing plants, impact, wild vines, invasion, infested natural, landscaped area

1. Introduction

Plants which attach themselves to an external support are called climbers or vines. Climbing plants grow vertically to a significant extent upon abiotic or biotic objects **(Garbin*et al*., 2012).** Supporting structure does not only involve enhanced fitness but also triggers changes in biomass allocation, growth form, physiology and morphology **(Gianoli, 2001 and 2003).** A climbing plant and its support constitute an ecologically coupled system in which the action of twiningand the perception of affordances form a continuous and cyclic loop **(Richardson *et al*.,2008).**

Tropisms play a fundamental role in plant development governing organ position and growth from the germination of a seed to the positioning of flowers for pollinators and seed dispersal **(Darwain, 1880)**. Climbing plants can sense up to 22 different biotic and abiotic factors including electrical, magnetic, chemical, and vibrational fields. Climbing plant apexes contain electrical, chemical, vibrational, gravitational and optical sensory transducers that afford information about the movement of the apex about the environment **(Chamovitz, 2012).**

Climbing plants can use various methods for the action of twining. They have tendril-bearers or hook-like thorns to gain a foothold every few centimeters as they rise. Some plants produce long and strong stems that arch over any supporting structure and then form a large and bushy plant crown. Some have tips that twist clockwise or anti-clockwise, threading their way through wire, trellis or shrubs and trees. Others produce aerial roots that adhere to firm surfaces. Root-climbers can dig deep down as attachment mechanisms **(Isnard& Silk, 2009).**

Wild vines are very destructive to native vegetation eventually killing it by excluding light, encouraging variety of animals and insects **(Carello*et al*., 2012).** When invasive climbers are established, they can grow fast and vigorously on different sides bending in one direction, then in the opposite one. It is often hard to control them unless it is regularly pruned. They can develop great mass and cause considerable damage. They may be extremely difficult to remove, particularly if they have invaded buildings and boundaries **(Mugnai *et al*., 2007).** Some climbing plants are very aggressive and become a source of annoyance in the way they anchor themselves to your walls, pipes, roofs, cords, wires or trees. They enter fine cracks, expand and widen the gaps then cause serious structural problems. These destructive plants are often known as “self clingers”.

The aim of this study is to illustrate the harmful impact effect of wild climbing plants in Jazan city and suggest the solutionsand ways of control in natural and urban areas.

2. Materials and Methods

The wild climbing plants existedat different localitiesin Jazan City. They were identified by means of comparison with specimens kept in the herbarium of Biology Department,Faculty of Science, Jazan University by the use keys of (**Shaukat, 2000 and 2001)**.The selected species are too invasive and most of people complained of them. They are different species which belong to different families. There are different means ofharmful impact effectsofstudied plant species.

3. Research Findings

1) *Leptadeniaarborea*(Forssk.) Schweinf.
Family: Asclepiadaceae
Botanical description
A tangled leafy vine with stems 6 m long and usually rounded but sometimes long narrow leaves; creamy flowers 5 mm wide, in heads; sweet scent; large fruits over 8 cm long **(Fig.1)(Shaukat, 2000 and 2001).**

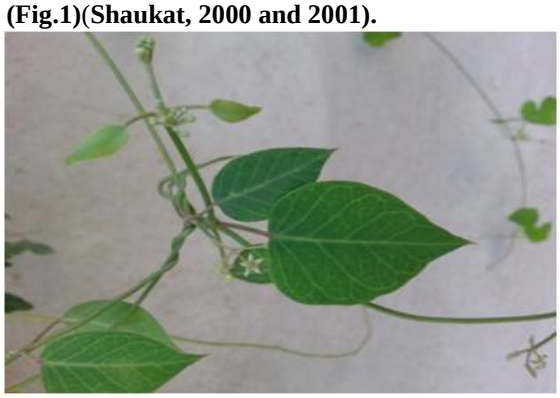

Figure 1: *Leptadeniaarborea* (Forssk.) Schweinf

2) *Ipomoea eriocarpa*R. Br.
Family: Convolvulaceae
Botanical description
A small leafy vine with stems to 35 cm long and heart shaped leaves; lilac flowers 1 cm wide with a darker centre; erect fruits, the hairy capsule cupped in a flower like calyx**(Fig.2)** (**Shaukat, 2000 and 2001).**

Figure 2: *Ipomoea eriocarpa*R. Br.

3) *Momordicacharantia* L.
Family: cucurbitaceae
Botanical description
A tangled leafy vine with 6 m or longer and simple, alternate leaves 4-12 cm across, with 3-7 deeply separated lobes; yellow flowers on short (female) or long (male) peduncles that are short-lived; ovoid, ellipsoid or spindle shaped fruit**(Fig.3)(Madhu, 2011).**

Figure 3: *Momordicacharantia* L.

Impacts to biodiversity
a) Vegetation communities
It alters ecosystem structure through competition with other native and cultivated plants as twisting over plants to overcome their spread**(Fig.4).**

Figure 4: Vine impact to vegetation community

b) Wild life
It can negatively affect wildlife by altering habitat. It can spread creeping insects especially ants and bug facilitating it to enter houses. The vine makesholes which can encourage vermin, bats, and insects present in the home. It could lead to further declines in the population livestock as *Leptadeniaarborea* which is regarded as a whole toxic plant to mammals as camels **(El-Hassan *et al*.,2003).**

Impacts to Recreation
It can inhibit recreational activities in areas where it has become established. Fences, walls, pipes or doors are difficult to reach due to the dense tangled mats of vegetation. It also reduces the aesthetic valueof favorite nature areas by masking the architecture features and reducing the number and variety of native and ornamental plant species **(Fig.5& 6).**

Figure 5: Vine impact to Pipe Recreation

Figure 6: Vine impact to Fence and Door Recreation

Impacts to Building and Structures

It may be extremely difficult to remove, particularly if it has invaded buildings and boundaries or escaped into a neighboring property or the bush land beyond. It can enter intoroofspace,dislodge tiles and fine crackstimbers where expands and widen the gaps. It can develop great mass and cause considerable damage as well as nuisance value.It means shockingly expensive repairs **(Fig.7).**

Figure 7: Vine impact to Building and Structures

Impacts to service cabinet outdoor

It is the most dangerous impact case which may lead to huge damage inside the city. They can also penetrate the service cabinets present outside in the streets. It includes general electric transformers, high pressure volt cabinets, water pumps of houses and lamps of streets **(Fig.8&9).**

They can start to enter the roofspace, dislodge tiles, crack timbers, and the holes which can encourage vermin, bats, insects and all sorts of creatures to make their homes inside the service cabinets.

Figure 8: Vine impact to Electric Transformer

Figure 9: Vine impact to Volt Cabinet

4. Discussion

The harmful impacts of wild vines on biodiversity, economy and society can be reduced if some management practices are carried out. It is important to use a control plan that incorporates with existing knowledge about the pest vine and its surrounding environment to prevent fighting infestations **(Weed and Casagrande 2010)**.

Once pest vine has been confirmed at a location, a control plan can be developed based on site accessibility, infestation size, the potential for spread and the risk of economic, environmental, or social impacts. Site specific conditions such as landscaped communities, high buildings and houses or water table fluctuations should also be considered when developing a control plan. The prioritizing invasive pest vine should be determined before starting control efforts to help ensure proper methods and timing are used to minimize adverse impacts **(Smith *et al.*, 2006)**.

Land managers should first focus their efforts on preventing pest vine spread by removing small populations and isolated plants (satellite infestations) outside the main infested area.

When this action is taken early it can significantly reduce the cost of control **(Milbrath 2008)**.

It is most likely that the site will be re-invaded before it has a chance to regenerate on its own. Restoration will be needed to reduce the risk of re-invasion of pest vine. Restoration can be a critical aspect of invasive plant management. Site restoration will result in a healthier ecosystem more resistant to future invasions. All restoration activities should be monitored to ensure the establishment of native plant species and continuous removal of invasive pest plants from the site. Seeding, planting or soil chemistry changing after management activities may be useful to prevent the establishment of new invasive pest species**(Smith 1998)**.

5. Conclusion and Recommendation

The wild climbing plants have great harmful impact effects on any infested natural or landscaped area. These impact effects may be observed immediately or on long range. They are localized or spread all over the region. So, there are some suggested ways of control which help to eliminate danger of wild invasion.

5.1 Control measures

1) Mechanical control

a) Digging

Land managers have reported thatdigging up the root crown is more effective than hand pulling.

b) Mowing

Mowing is the most effective in monocultures; it isnot selective and will impact other species if they are growing in the area that is mowed.

c) Clipping

Clipping is considered more ecologically friendlythan mowing.It can provide an effective reduction in seed production.

d) Tarping

It refers to covering anypest plantwith a dark material to block sunlight invasion and denature the root system.

2) Biological control

a) Grazing

It may reduce competition from other native species

b) Tilling

It may prevent wild vine spreading and contribute infestation of native plant species.

3) Chemical control

a) Painting

It may avoid having trail up on the walls by painting or pebbledash.When tree or shrub trunk is painted, seedlings of vines can grow towards regions of lowered red :far-red radiation ratio leading to decrease the ratio of chlorophyll**. (Ballare´ *et al*. 1987; Orr *et al*. 1996).**

b) Herbicide

Glyphosate and Triclopyr are the most common herbicide which can be used to vine control. Over spraying may be harm for neighboring desirable plants.

4) Natural control

It is the use of a predator, herbivore, disease, larvae or other natural enemy to reduce established vine species. It is considered as the most effective and safe method for the environment.

Stem scraping apply method may help infection from other microorganisms besides harmful effects of abiotic factors like sun rays. This method is the most promising control option which can accelerate natural vine denaturation.

Biocontrol projects should be established by collaboration with scientists in different universities and research institutions to determine the type of biological control for each pest vine.

According to all control measures, we can conclude that the early discovery for wild infestation is the easier way to control. The biological control is the best method because it is a friend of the environment. It cannot pollute the ecosystems and erase the impact naturally.

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