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Invasive plant species of Maharashtra state: a review.

Especies de plantas invasoras del estado de Maharashtra: una revisión.

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ABSTRACT

Invasive plants are the species which do not occur naturally in the region but rapidly proliferate in the area where they introduced and causes several negative impacts on local biodiversity, economy and human health. Many such plants are intentionally or non-intentionally introduced in various regions of the world and particularly in India. In the state of, Maharashtra many such plant species have been introduced deliberately for the purpose of ornamentation, agriculture and for other purposes. In this article, efforts are taken to gather information of such invasive alien species introduced in different regions of Maharashtra state.

Key words**-** Alien, Invasive, Plant species, Maharashtra, Review, Biodiversity.

RESUMEN

Las plantas invasoras son las especies que no se encuentran naturalmente en la región pero que proliferan rápidamente en el área donde se introdujeron y causan varios impactos negativos en la biodiversidad local, la economía y la salud humana. Muchas de estas plantas se introducen intencionalmente o no en varias regiones del mundo y particularmente en la India. En el estado de Maharashtra, muchas de estas especies de plantas se han introducido deliberadamente con fines ornamentales, agrícolas y con otros fines. En este artículo, se realizan esfuerzos para recopilar información de tales especies exóticas invasoras introducidas en diferentes regiones del estado de Maharashtra.

Palabras clave: exóticas, invasoras, especies de plantas, Maharashtra, revisión, biodiversidad.

INTRODUCTION

Alien invasive species are non-native or exotic species which are introduced either accidentally or deliberately (Singh and Kumari,2013). It is evident from critical observations that, invasive species like *Ageratum conyzoides, Argemone mexicana, Blumea lacera, Cassia occidentalis, Datura innoxia, Echinops echinatus, Glossocardia bosvallea, Ipomoea pes-tigridis, Lantana camara, Merremia aegyptia, Parthenium hysterophorus, Sesbania bispinosa, Tribulus terrestris, Xanthium strumarium, Youngia japonica* and many others are the plants of American origin proved to became invasive in many countries in the world including India (Reddy *et.al*, 2008). These species thought to be introduced in different countries through import and export of grains as well as for the purpose of ornamentation. In, India *Lantana camara* was introduced in the early 19th century as an ornamental plant (Hiremath, 2018) and *Parthenium* grass was introduced through wheat imports from America in 1956 (Jana, 2015). Now a day, various invasive plants including *Lantana camara* have occupied almost every continent of the world (Goncalves *et.al*., 2014).

As compare to native plants, invasive plants are characterized by their fast growth, higher leaf area, shorter life cycle, more seed production, wide dispersal mechanism, higher seed germination percentage, ability to adapt in new environmental conditions (Daehler,2003).

It is reported that, once established to a particular region, invasive plants start competing the native flora in several ways. Invasive plants occupy more area thereby reducing the growing ability of original native inhabitants (Gioria *et al*, 2018). Sometimes they show allelopathic effects on the native tree seedlings and seeds (Thiebaut *et.al*.2019). Due, to their overcrowding, sometimes they invite fires and ultimately soil erosion (Keeley, 2006, Brooks *et.al*.,2004). It is also reported that, some invasive plants species establish underground mutualism with some soil fungi and checks growth and germination of the native plant species (Geisen *et.al*., 2021). Not only they are deadlier to native plants, they also impose many ill effects on local animals, birds and human being too. Many invasive plant species are proved to responsible for decreased bird diversity, toxic to livestock and affects many health problems to human being (Schirmel *et.al*., 2016). It is also reported that, various invasive species caused great economic losses in agriculture (Reddy *et.al*, 2008).

The invasive alien species negatively impacts on biodiversity and ecosystem. Protected areas including wildlife sanctuaries and national parks form different parts of India also affected by these invasive species like *Lantana* and *Eupatorium (*Hiremath and Sundaram,2013*)*. The local biodiversity of such protected area is being negatively affected

by these invasive species (Reddy *et. al*, 2008). Scientists and conservationists can address this issue together (Kannan *et.al*., 2013, Hiremath and Sundaram,2014, Singh,2017).

Some invasive species apart from their negative activities plays some important roles as medicine. They have some ethnomedicinal uses including anticencerous, antidiabetic, antimicrobial, antitubercular and other pharmacological uses. An important invasive species, *Lantana camera* is useful to control blood sugar level. Similarly, *Amaranthus spinosus, Cassia alata and Argemone mexicana* shows antidiabetic properties. *Parthenium hysterophorous, Cannabis sativa, Euphorbia hirta, Solanum nigrum* shows active cytotoxic activity. Some plants like *Ageratum conyzoids* shows anti-tubercular activity. Even conatains some compounds like wedelolacetone are responsible for its anti-HIV activity*. Cuscuta reflexa, Catharanthus pusillus* are also potent against HIV. Many other medicinal uses of various alien medicinal plants have been reported by Sexena and Rao (2018).

India a rich biodiversity country contains highest number of invasive species in the world. Some of the invasive species reported from India are *Lantana camara, Parthenium hysterophorus, Ageratina adenophora, Prosopis juliflora* etc. In Maharashtra, many workers reported various invasive crops from different regions of state.

INVASIVE PLANTS FROM MAHARASHTRA

Many scientists from various regions of Maharashtra recorded invasive species. Rothe and Dhale (2016) took efforts to collect an information about impact of different invasive species on native plant diversity from Vidarbha region of Maharashtra. They have recorded different 233 invasive plant species from aquatic and terrestrial ecosystem. It is noted that, the families like Asteraceae, Cyperaceae, Poaceae, Convolvulaceae, Euphorbiaceae, Tiliaceae, Lamiaceae, Verbenaceae and Pontederiaceae are some of the dominant families from Vidarbha region which are having large number of invasive species. Invasive species are thought to be very harmful for local plants as well as animals.

Other impacts of these species includes disruption of natural ecosystem, alternation of soil chemistry, prevention of growth of native plants, increased soil erosion, allergic reactions, severe skin abrasions and burns, increased risks of wild fires, livestock and wildlife poisoning (Rothe and Dhale, 2016). The plants like *Cenchrus sp., Melanocenchris. Saccharum spontaneous, Setaria verticiliata, Lophopogon sp., Heteropogon contortus, Ocimum americanum* etc. found occupied the barren lands of the region. Field hedges are occupied by the invasive species like *Themeda quadrivalavis*, *Perotis*, *Triumfetta rotundifolia*, *Trichodesma zeylanicum*, *Ipomoea fistula*, *Lantana camera*, *Hyptis suaveolens*, *Anisomeles indica* and many others*.* Many other invasive species found grown

in cultivated lands along with crops. These plants are *Euphorbia rothiana*, *Chrozophor aprostrata*, *Ipomoea sinensis*, *Merremia emarginata*, *Cocculus hirsutus*, *Striga densiflora* etc.

Researchers like Deshmukh *et al*. (2017) took efforts to record invasive alien species from Bhiwapur tehsil of Nagpur district of Vidarbha. They recorded total 72 Species from the region of which dicotyledons represents by 64 species and monocotyledons represents total 8 species. According to their study, Asteraceae is the dominant family which represents maximum invasive alien species. Some of the invasive alien species recorded are *Acanthospermum hispidum, Amaranthus spinosus, Bidens pilosa, Calotropis gigantea, Cleome viscosa, Cuscuta reflexa, Echinops echinatus, Ipomoea nil, Lantana camara, Ocimum americanum, Parthenium hysterophorus, Typha angustifolia, Xanthium strumarium* etc. The aquatic invasive species like *Eichornia crassipes, Ludwigia adscendens and Pistia stratiotes* also recorded from various aquatic bodies.

Exotic medicinal plants from west Vidarbha region of Maharashtra have been studied by Rothe (2011). These plants were found grown along dams, canals, roadsides, around villages, on hedges of fields. Exotic plant species which are originated from various regions of world including Paleotropcal, tropical America, Mexico, South America, Africa, Eurasia Asia, Afro Asian and Pantropical have been recorded. Exotic plants recorded were *Ipomoea purpurea, Phyllanthus asperulatus, Dioscorea bulbifera, Lantana camera, Passiflora foetida, Xanthium strumarium, Coccinia grandis, Medicago sativa, Ricinus communus, Sesbania sesban* etc.

An enumeration of total 173 invasive plants species of India including Maharashtra is made by Reddy *et al.* (2008). According to them the most harmful invasive species of Indian land are *Alternanthera philoxeroides, Cassia uniflora, Chromolaena odorata, Eichornia crassipes, Lantana camara, Parthenium hysterophorus, Prosopis julliflora* and many others. Invasive plants in Maharashtra and different regions of India have been introduced from Australia, Western Asia, Europe, Mediterranean Area, Africa, America, Mexico, West Indies and Brazil. Dominant families comprising invasive species are Asteraceae, Pappilionaceae, Convolvulaceae, Ceasalpiniaceae, Solanaceae, Amaranthaceae, Poaceae and Euphorbiaceae (Reddy et al., 2008)).

Khandesh is one of the major regions of Maharashtra state which is situated at Northern site of state. It is also highly dominated by invasive species. Patil (2017) recorded total 120 invasive species from Khandesh region belonging to 39 families. The invasive species enlisted by him are *Acanthospermum hispidium, Ageratum conzoides, Blumea spp., Celosia argentea, Chrozophora rottleri, Emilia sonchifolia, Physalis angulata, Tribulus terrestris, Urena lobata* etc.

IMPACTS OF INVASIVE SPECIES

Invasive species proved to be harmful in different regions of Mahrashtra state and pose threats to biodiversity, environment, livestock, human health etc.

Different invasive species are observed to be responsible for reduction in local plant diversity, out competing of local plant seeds, alterations in plant and animal habitats, compete pollinating agents, Prevention of growth of local plants (Rothe and Dhale,2016). The plants like *Datura inoxia* and *Datura stramonium* are observed to cause delay in seedling growth of native plants (Deshmukh *et.al*, 2015, 2017). Majority of invasive species causes serious losses to cultivated lands and grasslands which ultimately troublesome to local farmers and causes loss in crop productivity (Patil, 2017). Many invasive plants line *Parthenium hysterophorus*, *Eupatorium odoratum*, *Hyptis suaveolens* and *Ageratum conyzoides* are reported to outcompete agricultural crops for water and nutrition which reduces crop yield and forage quality (Deshmukh et.al, 2015, Kumar and Prasad,2014). Western Ghats is a region of luxuriant vegetation of different types of forests passes through Maharashtra is also started its deterioration due to various invasive species. These invasive alien species like *Lantana camara*, *Ageratina adenophora, Mikania micrantha, Mimosa invisa, Bidens pilosa* and *Prosopis juliflora* started degeneration by various ways including, suppression of native vegetation, extinction of some native species, interfering wild life, poisoning of domestic and wild animals, reducing aesthetic value etc. (Muniappan and Viraktamath, 1993).

It has so many harmful impacts on local environment which include, alterations in soil chemistry, changes in soil structure and profile causing soil erosion, interference with forest regeneration, causes forest fires and disturbs physical, chemical and biological factors of an ecosystem (Rothe and Dhale,2016, Patil, 2017, Lone et.al.2019). Original native flora and fauna is also affected due to formation of clogs in water bodies by aquatic invasive plants like *Eichornia.* It also disturbs public water supply as well as irrigation system (Deshmukh et.al, 2015)

It is also reported that, different invasive species like *Ageratum conyzoides, Parthenium hysterophorus*, *Lantana camara*, *Calotropis procera*, pose many allergic reactions, severe skin abrasions, temporary and permanent blindness and such another harmful effects on animals including human (Deshmukh *et.al*, 2017). Many invasive species have replaced local grazing vegetation there by cause poisoning in livestock and wildlife (Rothe and Dhale,2016). Invasive plants like *Parthenium hysterophorus, Lantana camara, Typha, Eichornia crassipes* provides home for many pathogens/flies like *Glossina*

which causes many diseases like tuberculosis, slipping sickness, allergy etc. in man (Rai and Singh, 2020).

CONCLUSION

Maharashtra is one of the major agricultural states of India. Many different types of agricultural crops are grown in the state. But, unusual weed growth is becoming a major issue for the farmers. Not only agriculture but grazing grassland areas also highly accumulated by different types of invasive plants like *Lantana camara*, *Prosopis julliflora* and many other plants. Apart from these effects, invasive alien plants start competing local plants, shows allelopathic effects on native seeds and seedlings, causes soil erosion, forest fires. They also have deadlier effects on plants, animals, birds and even human being. The invasive alien species negatively impacts on biodiversity and ecosystem. Protected areas including wildlife sanctuaries and national parks form different parts of India also affected by these invasive species like *Lantana* and *Eupatorium*. Aquatic invasive plants like *Eichornia* and *Typha* also grounds threat to fresh water ecosystem and responsible for water pollution. Now a day, the area of agricultural land as well as grazing grassland is reducing due to urbanization and industrialization. Unlimited and uncontrolled growth of invasive plants is negatively affecting local agricultural crops and local terrestrial and aquatic biodiversity. It is need of time to save native crops as well as biodiversity from such alien invasive plants. Ecologists and conservationists should come forward to tackle this issue.

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