

Occurrence of alien alligator weed in India with special reference to its infestation in some districts of Madhya Pradesh

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ABSTRACT

Alligator weed, *Alternanthera philoxeroides* (Martius) Grisebach of family Amaranthaceae, is a native of south America but has spread to 30 countries in the world. At present, the weed has spread to many states of India and has become a problematic weed in aquatic body, ditches, canals and vacant low land areas in residential colonies. Survey revealed the occurrence of alligator weed in Madhya Pradesh, Maharashtra, Assam, Meghalaya, Arunachal Pradesh, Bihar, Haryana, Himachal Pradesh, Karnataka, Kerala, Orissa, Tamil Nadu, Uttarakhand, Uttar Pradesh and West Bengal. The infestation of alligator weed varied pond-to-pond ranging from 0.0 to 91.40% in Jabalpur, Satna and Rewa cities of Madhya Pradesh. Out of 27 ponds surveyed in Jabalpur, alligator weed was not found in six ponds. In four ponds infestation ranged between 1 to 25% while 25 to 50% infestation occurred in 8 ponds. In 9 ponds, more than 50 per cent infestation was found. Out of four ponds in Rewa city of Madhya Pradesh, the weed was found in one pond infesting about 45% area of the pond. Weed infestation was severe in two out of three ponds in Satna. These figures clearly indicate the severity of the weed problem in Jabalpur in Particular and in India in general.

Key words : Alligator weed, Spread in India, Infestation

Alligator weed, *Alternanthera philoxeroides* (Martius) Grisebach of family Amaranthaceae, is a native of south America but has spread to 30 countries in the world. It is a major problem in USA, Puerto Rico, New Zealand, Burma, China, Thailand, Indonesia and Australia. In many countries, it has been proclaimed as a state-prohibited weed, which reflects its seriousness in terms of its threat to public interest. In America, it generally occurs in places like river and stream banks and on adjacent water, on floating vegetation mats, in swampy and also in dry land area (Julien 1981). It was reported to invade similar range of habitat in Australia, New Zealand and China where it has been considered as an important weed. Alligator weed grows very fast which can cover water ways and may adversely affect the flow of water, navigation and aquatic flora and fauna (Julien and Broadhent 1980; Spencer and Coulson 1976). Terrestrial form of alligator weed invades and competes with pastures and provides a source for its further spread (Julien and Bourne 1988). In USA, it became a menace in navigation and US army had to spend huge amount of money to clear the path for navigation from the infestation of this weed. In China, it has been reported to be one of the most damaging weeds in many terrestrial and aquatic crops including rice, wheat, maize, sweet potatoes, vegetables and fruit trees (Tan 1994). *A. philoxeroides* was first reported in India from Bihar and West Bengal (Maheswari 1965) followed by Bangalore (south India) (Sankaran and Narayanan 1971) Kerala (Madhusoodanan and Kumar 1993), Maharashtra (Wagh *et al.*, 1995) and Madhya Pradesh

(Sushilkumar and Bhan 1996). At present, the weed has spread to many states of India and has become a problematic weed in aquatic body, ditches, canals and vacant low land area in residential colonies (Sushil Kumar and Vishwakarma, 2003). The weed can tolerate wide variety of macroclimate. It can grow in aquatic and moist terrestrial situation.

MATERIALS AND METHODS

Survey was made for the occurrence of alligator weed in many cities of India in various visits made during 2001 to 2008. Whenever, alligator weed was found in any aquatic and terrestrial situation, its presence was recorded. Literature survey was done for the published record of weed. A systematic survey of all the available ponds of Jabalpur, Rewa and Satna districts of Madhya Pradesh was carried out during 2001 to 2003. An attempt was made to quantify the infestation of alligator weed by measuring total pond area and infestation of alligator weed therein with the help of Theodolite.

RESULTS AND DISCUSSION

Survey revealed the occurrence of alligator weed in Madhya Pradesh (Jabalpur, Satna, Rewa, Sidhi, Ujjain, Katni, Gwalior, Indor, Bhopal), Maharashtra (Pune, Rahuri, Nasik), Assam (Jorhat, Guwahati), Meghalaya (Shillong), Arunachal Pradesh (Eta nagar), Bihar (Patna), Haryana (Hissar, Ambala, Sonapat, Gurgaon) Himachal Pradesh (Palampur), Karnataka (Bangalore), Kerala (Thrissure, Trivendrum), Orissa (Bhubenashwar, Cuttck),

Tamil Nadu (Coimbatore, Ooty) Uttarakhand (Jaspur, Kashipur, Dehra Dun), Uttar Pradesh (Kanpur, Lucknow, Jhansi, Meerut, Gajjiabad, Muzzaffarnagar, Bulandshar, Bijnor) and West Bengal (Kolkatta, Midnapur). Alligator weed occurred mainly in aquatic bodies like ponds, reservoirs, ditches and low land areas besides in open drainage system. In Shilong (Meghalaya), alligator weed occurred abundantly on the roadside as terrestrial weed, particularly in the areas of high moisture regime.

Infestation in ponds of Jabalpur, Rewa and Satna

The infestation of alligator weed varied pond-to-pond ranging from 0.0 to 91.40% in Jabalpur, Satna and Rewa cities of Madhya Pradesh. Out of 27 ponds surveyed in Jabalpur, alligator weed was not found in six ponds. In four ponds infestation ranged between 1 to 25% while 25

to 50 % infestation occurred in 8 ponds. In 9 ponds, more than 50% infestation was found. Out of four ponds in Rewa city of Madhya Pradesh, the weed was found in one pond infesting about 45% area of the pond. Weed infestation was severe in two out of three ponds in Satna. These figures clearly indicate the severity of the weed problem in Jabalpur in Particular. The reason of fast spread of alligator weed in aquatic bodies of Jabalpur was attributed to the decrease of water hyacinth infestation due to well establishment of water hyacinth weevil *Neochetina* spp, a host specific bioagent. It was observed that since initial survey in 1994, population of water hyacinth has decreased due to continuous attack of weevil *Neochetina* spp. The niche vacated by the water hyacinth has rapidly been replaced by alligator weed (Sushilkumar and Bhan 1996).

Table 1 Infestation of alligator weed in different ponds of Jabalpur, Satna and Rewa (Madhya Pradesh)

S. No.	Name of the ponds	Total area (in hectare)	Infested area (in hectare)	% Infestation
1	Ranital, Jabalpur	3	2.2	73.3
2	Mahanaddha, Jabalpur	2.5	2.0	80.0
3	Man Singh ka talab Jabalpur	16	4.2	26.25
4	Gulauatal, Jabalpur	3.5	3.2	91.4
5	Shukha tal, Jabalpur	7.5	3.6	48.0
6	Roza tal, Jabalpur	4	2.1	52.4
7	Madhatal, Jabalpur	3.5	1.9	54.28
8	Nagtal, Jabalpur	4.6	1.1	23.9
9	Hara talab, Jabalpur	3.2	1.0	31.25
10	Nunser talab, Jabalpur	5.0	0.5	10.0
11	Hanumantal, Jabalpur	3.5	0.0	0.0
12	Supatal, Jabalpur	5.0	1.9	38.0
13	Adhartal, Jabalpur	4.5	2.1	46.6
14	Gangasagar, Jabalpur	7.5	3.1	41.3
15	Devtal, Jabalpur	3.5	2.4	68.57
16	Barela talab, Jabalpur	4.5	1.2	26.6
17	Imarti talab, Jabalpur	3.4	1.1	32.35
18	Bilpura talab, Jabalpur	3.0	0.2	6.6
19	Khamariya talab, Jabalpur	4.2	0.0	0.0
20	Cherital, Jabalpur	2.6	0.6	23.0
21	Ranital (Rewa)	3.5	1.6	45.71
22	Baikunthpur talab (Rewa)	2.6	0.0	0.0
24	Hanumanatal (Rewa)	2.5	0.0	0.0
23	Piparaha talab (Rewa)	4.5	0.0	0.0
24	Jagatdev talab (Satna)	5.2	3.8	73.07
25	Muktyarganj talab (Satna)	4.5	2.9	64.4
26	Sagra talab (Satna)	3.5	0.0	0.0

Impact of alligator weed

The alarming spread of alligator weed in ponds, open drainage systems and low land areas has adversely affected human access, flow of water and fishing in the ponds. About 3-4% more loss of water through evapotranspiration was observed due to the presence of alligator weed. Its growth was found replacing other vegetation rapidly in aquatic and terrestrial situations, hence, it has been considered a threat to biodiversity. It has been found to affect drainage systems severely in Jabalpur, Guwahati and Jorhat. In Jabalpur, it has been observed to invade vegetable crops like tomato, brinjal, kaurliflower, ladies finger etc. and maize crop. In Palampur (Himachal Pradesh), it has been found to invade extensively in maize crop. In Bhubaneswar (Orissa), alligator weed was found to infest rice crop. In Shilong (Meghalaya), this weed was found abundantly on the roadside as terrestrial weed in high moisture regime area, thus threatening local biodiversity. The terrestrial form of the plants has also infested low-lying land, smaller waterways and swamps. It is pertinent to mention that this weed was introduced in southern China in the late 1950s but now has distributed nation-wide and is reported to be damaging weed in many terrestrial and aquatic crops including rice, wheat, maize, sweet potato, vegetables and fruit trees (Tan, 1994). This weed has been reported to be a serious threat in navigation for army in Central America. Seeing the occurrence and fast spread of this weed, it may be surmised that the alligator weed may be a serious threat to the ecology of inland river system, wetlands and irrigated and terrestrial crops in India especially when its current distribution and spread is only a fraction of its potential distribution.

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