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PHYTO-SOCIOLOGICAL SURVEY ON *PARTHENIUM HYSTEROPHORUS* INFESTATION IN NON-CROPPED AREAS OF CUDDALORE DISTRICT (TAMILNADU), INDIA

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Abstract

A weed survey carried out to assess the infestation of *Parthenium hysterophorus* during September, 2010 in Cuddalore district (Tamilnadu), India. The Importance Value Indices (IVI) computed for individual species indicated that *Parthenium hysterophorus* recorded the highest IVI values ranging from 24 to 33 in all the survey sites, followed by *Cyandon dactylon*, *Trianthemaportula castrum* and *Dactylacteniumae gypticum.* The highest degree of prepondarance of *Parthenium hysterophorus* in non-cropped areas revealed that parthenium was a potent invader of this area and this finding provides awareness and the importance of managing this weed in order to keep this noxious weed species under control.

Key words : Phyto-chemical survey, Importance Value Indices (IVI), *Parthenium hysterophorus*, *Dactylacteniumae gypticum.*

Introduction

Parthenium hysterophorus L. (Asteraceae : Heliantheae) was an annual or short-lived perennial herbaceous plant (Adkins *et al*., 2011). It was one of the most aggressive invasive weeds, threatening natural ecosystems and agro ecosystems in over 30 countries worldwide. It caused losses of crops and pastures, degrading the biodiversity of natural plant communities, human and animal health hazards and results in serious economic losses to people and their interests in many countries around the globe. Several of its biological and ecological attributes contribute towards its invasiveness (Adkins and Shabbir, 2014).

In India, *Parthenium hysterophorus* L. invaded in large extent in most of the useful field areas of urban and village up to an extent of 35 million hectares (Sushilkumar and Varshney, 2010). India was observed to be one of the most affected countries with parthenium weed now occurring in all of its States and presenting a major problem in those States that have large areas of noncropped, rain-fed land (Kumar *et al*., 2008). Some of the ecological traits of congress grass in Veeranum Ayacut region of Tamil Nadu State shown to have two generations in a calendar year and congress grass germinated with maximum temperatures between 30ºC and 34ºC coupled with available soil moisture between 40 and 60 per cent coincided with February and September months and the weed was observed to be occurred only in the wasteland and was not expanded into cultivated fields (Kathiresan, 2008). To increase the current understanding of the distribution of *P. hysterophorus* and to monitor future spread and abundance, additional surveys are required in these countries like India, Australia and the Asian-Pacific region, as well as parts of Europe, most of sub-Saharan Africa that were climatically suitable and at risk, as predicted with CLIMEX model (McConnachie *et al*., 2011). Hence, a survey was programmed with the objective to assess the intensity of infestation of *Parthenium hysterophorus* in Cuddalore district (Tamilnadu), India.

Materials and Methods

Phyto-sociological survey was taken up in non-cropped areas to assess the parthenium infestation during September, 2010 in Cuddalore district (Tamilnadu), India. Five different places were selected at 5 km distance (up to 25 km). Observations were recorded from 10 quadrates of size 0.5 m × 0.5 m and importance value index (IVI) was computed for all the individual species following the formulae suggested by Mishra (1968).

Table 1 : Phyto-sociological survey in non-cropped area of Cuddalore district.
(Importance Value Index)

Weed species	Site I					Site II					Site III					Site IV					Site V				
	Field No.					Field No.					Field No.					Field No.					Field No.				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Parthenium hysterophorus	28.21	32.91	30.31	27.90	25.01	29.23	33.82	35.34	31.36	32.55	32.88	29.09	28.91	27.21	27.68	24.93	28.25	25.14	27.27	27.87	32.24	30.21	28.5	33.50	30.42
Cynadon dactylon	22.50	24.87	21.96	22.32	22.57	24.53	22.43	24.42	21.01	23.76	22.21	24.05	25.78	21.11	23.43	22.49	22.24	23.01	24.51	24.61	25.35	28.36	23.80	21.50	21.51
Trianthemaportula castrum	17.80	20.01	20.21	20.03	21.21	22.94	20.31	18.13	20.21	19.22	15.66	21.22	16.46	19.32	18.56	19.57	20.46	19.09	22.03	18.66	18.32	19.05	20.35	18.25	20.72
Dactylacteniumae gypticum	16.05	13.61	12.51	16.71	18.89	12.90	13.44	15.53	17.04	15.16	14.76	15.17	14.93	16.36	16.22	17.33	16.57	17.82	16.22	13.53	16.81	14.33	13.82	14.58	17.25
Chloris barbata	9.26	4.89	7.62	7.94	8.42	7.24	6.54	4.42	7.32	6.55	9.21	5.32	6.56	8.22	6.42	9.36	7.28	6.76	4.30	8.01	3.79	5.36	6.19	8.01	7.24
Cyperus rotundus	4.17	2.39	6.67	3.93	2.87	2.76	2.97	1.96	1.57	1.86	4.31	3.81	6.82	7.01	6.53	5.21	4.23	6.36	4.21	4.93	1.98	0.56	2.89	1.86	0.58
Boerhavia diffusa	0.82	0.51	-	0.87	0.98	-	-	-	0.76	0.58	0.53	0.47	-	0.38	0.57	0.53	-	-	-	1.83	-	-	0.80	0.85	1.35
Acalypha indica	0.42	-	-	-	-	-	-	-	-	-	0.40	0.52	0.45	0.38	0.41	0.37	0.35	0.41	0.51	0.43	-	-	1.20	0.60	-
Prosopisjuli flora	0.52	-	0.43	-	-	-	-	-	0.66	-	-	-	-	-	-	-	0.42	1.36	0.73	-	1.36	1.85	2.21	0.75	0.84

Relative dominance (R.Do)% =

$$\frac{\text{Dominance of a particular species}}{\text{Sum total of the dominance of all species}} \times 100$$

Relative density (R.De)% =

$$\frac{\text{Density of a particular species}}{\text{Sum total of the density of all species}} \times 100$$

Relative frequency (R.F.)% =

$$\frac{\text{Frequency of a particular species}}{\text{Sum total of the frequency of all species}} \times 100$$

$$\text{IVI} = \frac{\text{R.Do + R.De + R.F.}}{3}$$

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Results and Discussion

The Importance Value Indices (IVI) was computed for the individual weed species of occurrence in every sampling sites of Cuddalore district were furnished in table 1. In all the sampling sites, IVI computed for individual species indicated that *Parthenium hysterophorus* was the predominant weed with the highest IVI values in range of 24 to 33 followed by *Cyandon dactylon, Trianthemaportula castrum* and *Dactylacteniumae gypticum.* All the other species recorded were low in IVI and they were also rare in occurrence. The highest degree of predominance of *Parthenium hysterophorus* in non-cropped areas of Cuddalore district might be due to the conducive climatic conditions prevailed in this location especially the temperature and moisture. Further, the invasive traits like prolific seed production potential and seed dispersal (wind, water and vehicles), allelopathic potential against other plant species, absence of natural enemies and lesser herbivorous pressure makes the parthenium more invasive compared to the other species found in this location. Similar findings regarding the predominance of this weed have been reported earlier by Kathiresan (2006), Javaid *et al.* (2007) and McConnachie *et al.* (2011).

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