



INVASION OF *PARTHENIUM HYSTEROPHORUS*. L WEED OVER OTHER COMMON WEEDS IN THE VAVUNIYA DISTRICT, SRI LANKA

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Introduction:

Parthenium weed (*Parthenium hysterophorus*) is one of the most aggressive invasive weeds, threatening the natural and agro-ecosystems in over 30 countries worldwide. According to the global invasive species database, the *Parthenium* weed is included in the top ten worst weeds of the world. It is commonly found as lavishly growing in bare land, urban areas, and waste dumping areas, on sides of access paths, orchards and construction sites. *Parthenium* produces a large number of seeds which favour quick spread. Further, the large lower leaves spread on the ground like a carpet, preventing growth of any other vegetation underneath (Lakshmi et al., 2007), thereby it suppress the growth of other species.

In addition, the *Parthenium* weed has been found to cause several health effects on animals as well as on human beings. According to Kaur et al., (2014), the diets containing significant amount (10 – 50%) of this weed could cause lethal effects on cattle. The pollen and the airborne dried parts of this weeds have been found to cause allergic effects, such as dermatitis, asthma, and bronchitis in human beings (Kaur et al., 2014). Therefore, the need of the control of *Parthenium* weed is highly emphasized by the health professionals, environmentalists and government authorities. In this context, the objective of this study was to assess the degree of invasion of the *Parthenium* weed in Vavuniya district

Methodology:

Invasive alien species (IAS) provincial profile map of the Vavuniya District, Northern Province was used as the secondary data for this study (unpublished report, 2015). Field survey and the investigation were carried out to quantify the distribution and composition of the *Parthenium* weed and the other relevant species in 21 locations on various land types such as barren lands, agricultural lands, village tanks, associated lands, and road sides. At each sampling location 05 experimental quadrats with *Parthenium* infestation and five control quadrats without *Parthenium* infestation over different land use types. Then, the number of *Parthenium* weed was compared with the other weeds. The species distribution was studied using randomly selected quadrats of 2 x 2 m.

In order to assess the degree of invasion by *Parthenium* weed, Absolute density, Relative density (%), and species abundance and evenness using Shannon Index of weed species were analyzed using standard methods as mentioned in the previous researches (Nguyễn et al., 2017 and, Travlos et al., 2018). The Shannon diversity index (H) accounts for both abundance and evenness of the species present. This was used to characterize species diversity in a community using the equation below.

$$H = -\sum_{i=1}^s P_i \ln P_i$$

Results and Discussion:

Based on the field survey the flora species excessively distributed along with *Parthenium* were *Tephrosia purpurea*, *Cleome viscosa*, *Ocimum canum*, *Tridax procumbens*, *Leucas zeylanica*, *Mimosa pudica*, *Calotropis gigantea*, *Amaranthus spinosus*, *Emillia javanica*, *Stachytarpheta jamaicensis*, *Lantana camera*, *Dichrostach cinerea*, and *Vernonia cinerea*. As illustrated in the figure 1, the *Parthenium* was found to be with the highest absolute density (1.65 m²) in the sampled area compared to the other weeds. Next to *Parthenium*, *Tephrosia purpurea* (0.3), *Cleome viscosa* (0.25), *Ocimum canum* (0.35) with moderate absolute density were not suppressed much by *Parthenium* while the rest of the species showed the values less than (0.25). It was revealed that *Parthenium* has an impact on distribution of other native species. When considering each quadrat with high infestation individually, mean density of the other species was less.

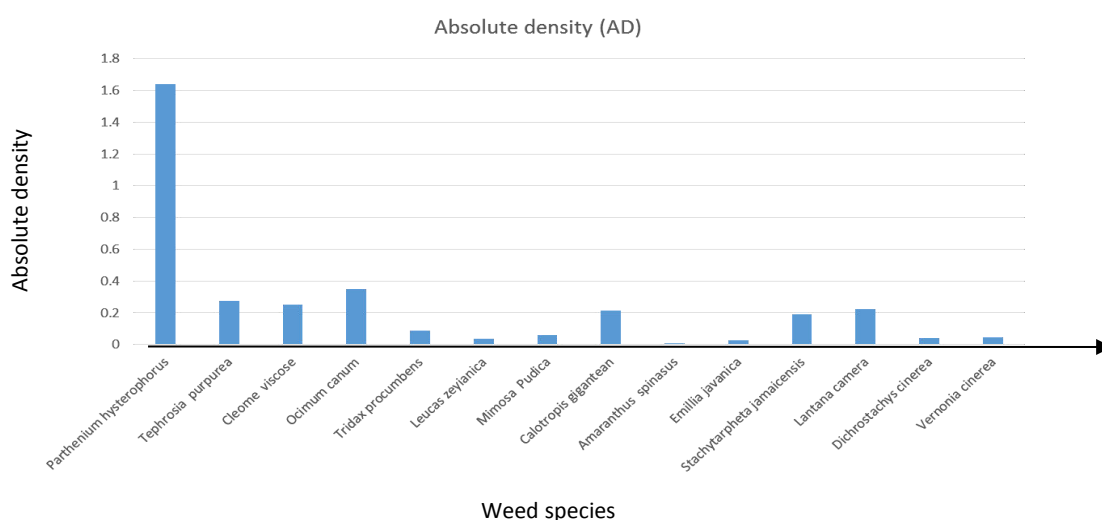


Figure 1: Absolute Density of *Parthenium* and other common weeds in the study area

The relative density of the species is illustrated in Figure 2 where most of the species showed low values. Comparison of species relative density individually with *Parthenium* indicates a characteristic influence on nearly seven species (Figure 3). This indicates the dominance of *Parthenium* and suppression of the other species as reported by Shrestha and Thapa (2018).

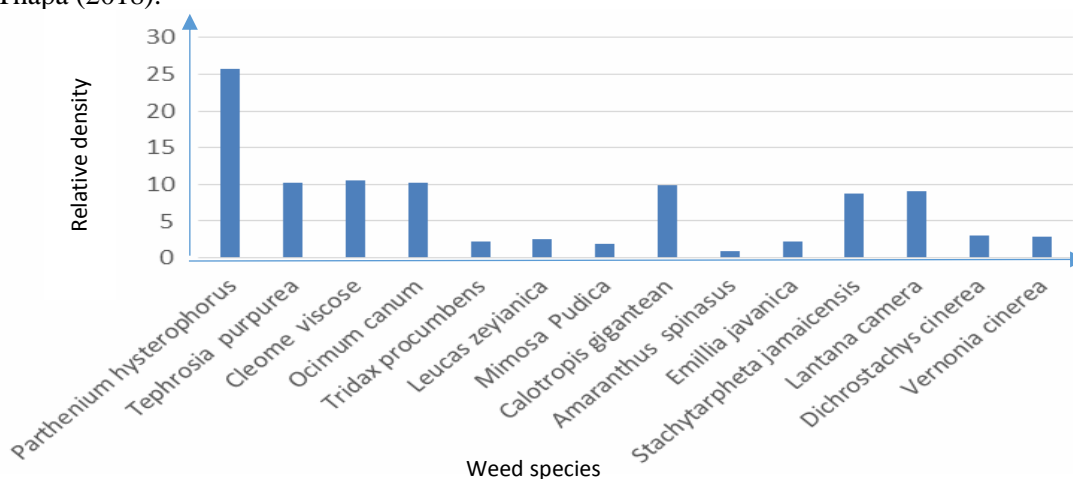




Figure 2: Relative Density of *Parthenium* and other common weeds in the study area

The analysis revealed that *Parthenium* was the most dominant species in the study area. Dominancy of all other species were much less than the dominancy of *Parthenium*. Quadrats without *Parthenium* showed a better distribution of other species. Grasses were at low risk as they are abundantly found in the sampled quadrats.

Using Shannon Index, the species richness and species evenness were estimated and found that in the range of 0.36 – 0.72 and 0.60 – 0.98 respectively. This result also revealed that agricultural lands and the closed proximity of the study area showed less distribution of *Parthenium*. However, the infestation of *Parthenium* in the town was found to be very high. Tanks and associated lands also showed less distribution except in Vavuniya tank which is in the town area where the storm water from the town area collects during rainy season. In Vavuniya the infestation of *Parthenium* in the town is very high. This may be the reason for the high distribution of *Parthenium* in the surroundings of the Vavuniya tank. Further the study revealed that barren lands showed considerable distribution while the roadsides or the paths along the road showed high distribution of *Parthenium* in the study area.

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