DISTRIBUTION AND ECOLOGICAL IMPACTS OF *Parthenium hysterophorus* L. IN ETHIOPIA

Z. Kassahun\(^1\) and W. Mersie\(^2\)

\(^{1}\)Ethiopian Institute of Agricultural Research, P.O. Box 2003, Addis Abeba, Ethiopia  
  kassahunzewdie@yahoo.com

\(^{2}\)Virginia State University, Box 9061, Petersburg, U.S.A.  
  wmersie@vsu.edu

Abstract: Parthenium (*Parthenium hysterophorus* L.) is an alien weed species introduced in Ethiopia some twenty-five years back. It has aggressive characters invading cropland, pastureland and irrigation canals causing an irreversible displacement of natural pasture grasses and has an effect on animal husbandry, human health and biodiversity. Parthenium is one of the major biotic limiting factors to the production of different crops and grazing lands in Ethiopia. To collect accurate information on the distribution, spread and impact of parthenium, field survey was conducted during 2006 and 2007 in central and southern parts of Ethiopia. The survey results indicated that it has a wider spread, infesting most of the surveyed areas. The infestation levels of parthenium varied from low (60% of the infested fields), moderate or high (5% of the infested fields) and to very high (35% of the infested fields). From the interviews done and data recorded, the infestation with parthenium is considered by 75% of the farmers as a very serious problem and 16% of them observed an increasing infestation over time, while 9% of them did not know the weed. In general the weed was found in varying dimensions in waste lands, and along road sides, railway tracks, and cultivated fields, attaining the status of a worst weed among the terrestrial weeds in the country.

Key words: *Parthenium hysterophorus*, ecological impacts.

Introduction

Congress grass /fever few/ wild fire (*Parthenium hysterophorus* L.) is alien or exotic weed to Ethiopia. There mere speculation that the weed was introduced to Ethiopia through aid food grain. The occurrence of the weed was first reported in eastern parts of the country, i.e. around Dire Dewa in 1967 (Frew et al. 1996). Since then it has spread to central and northern parts of the country especially along roadsides, and has demonstrated its’ ability of having an extraordinary capacity to spread rapidly. *Parthenium hysterophorus* L. is a noxious weed that competes strongly with different food crops for nutrients, water and sunlight. Hence, it affects the production of many crops.

Parthenium weed has evolved specificity to crops and plants in the natural vegetation. Other plant species could hardly establish themselves in a field infested with parthenium due to the antagonistic effect of the toxins produced by the roots of the weed. Parthenium is not only damaging the crop plants, but also poses a serious human and animal health risk due to the dangerous toxins that all parts of the weed can produce. It also lowers the quality of dairy products if dairy cows are feed to the weed (Rezene et al. 2005; Taye, 2002).

A considerable loss in growth and yield of many food and fodder crops is caused by Parthenium weed. Nowadays, parthenium is considered as the greatest single biotic constraint to food production in Ethiopia, where the livelihood of 70 million people is adversely affected. In infested areas, yield losses associated with Parthenium damage are often significant, ranging from 40-100 per cent (Kassahun, 1999). Moreover, it is
predicted that the grain production in Ethiopia is potentially at even increasing risk in the future. The study was conducted to collect information on the distribution and spread of parthenium in central Ethiopia.

**Materials and Methods**

Field survey was conducted in central Ethiopia: Central, East, and North Shoa, North Wolo and East Hararge during July-August 2006 and 2007. The survey covered grazing land, fallow land, roadside, residential area, riverside and in the land where different type of crops were grown. The major crops in the survey area are: Tef (*Eragrostis tef*), Wheat (*Triticum aestivum* L.), Sorghum (*Sorghum bicolor* L.) and Maize (*Zea mays* L.). Quantitative weed survey was undertaken. Five samples were collected from each locality with a quadrate of 1m$^2$ sampling area, within 25 km distance and the infestation was converted to a scale according to the density levels of the weed, namely, 1 plant/m$^2$ = low abundance, 2-3 plants/m$^2$ = medium abundance, and > 3 plants/m$^2$ = high abundance. Observation and counting of other weed species was done. The coordinates were recorded for each locality. By developing questionnaire that covers all general issues about exotic weeds were recorded. A total of 250 sample sites assessed. The infestation level observed from the sampled quadrants was ranged from low to high.

**Results and Discussions**

In all surveyed areas from Adama up to Boset (Figures 1 and 2), the weed was recorded at “high abundance”. The infestation observed was nearly equally distributed and indicated that all were beside the high way, residential areas, grazing areas and in the land where different type of crops were grown. From the interview done in these areas among farmers, *P. hysterophorus* ranked the top most problematic weed, as it was replacing other beneficial vegetations like grasses, and also spoils animal products such as milk giving bitter tests. It causes yield reduction of crops by draining the moisture, reducing soil fertility, and harbouring insect pests. The farmers in the countryside and some urban dweller responded that they often used hand pulling, and slashing and burning method to control the weed.

In Boset Woroda, 38 kebeles were totally invaded out of 42, and were hotspots for parthenium infestation. In this area, the highways at about 2 - 3 km radius were covered by the weed, besides most grazing areas. The other most endangered area was the national park of Awash (Figure 2).

Near and in Addis Abeba (Figure 1), the weed is spreading from Kaliti to Akaki at a very high coverage along the roadside in the field and in the fenced areas that are left for construction. In the Arsi zone, the invasion of parthenium was observed only at few locations. Its’ coverage in the area ranged from low to high (Figure 2). However, from Dera to Kofele, parthenium was not observed, and farmers and urban dweller were also unaware of the weed. Parthenium has being infesting the roadside at different spots; however it is moving near the farm land and replacing important grass species in the grazing land. The infestation level is very high at the roadside up to a 100 - 500 m radius and at low level in the farm land. In general the infestation levels of parthenium, varied, from low (60% of the infested fields), moderate or high (5% of the infested fields) and to
very high (35% of the infested fields). From the interview made and data recorded the infestation with parthenium is considered by 75% of the farmers as a very serious problem and 16% of them observed an increasing infestation over time, while 9% did not know the weed. Thus, the extent of problem caused by *P. hysterophorus* was very much severe as compared to other weeds in most of the sampled localities.

![Parthenium distribution](image1)

Figure 1. Areas of parthenium weed surveyed in central Ethiopia

![Level of infestation of parthenium weed in central Ethiopia](image2)

Figure 2. Level of infestation of parthenium weed in central Ethiopia

**Conclusions**

The survey results clearly indicated that education and awareness creation, establishing community based local rules and regulation, application of preventive measures, regular
assessment and eradication measures, and local quarantine regulation to minimize spread to other regions are important measures to limit the spread of *P. hysterophorus* in Ethiopia. The possible control options available to the farmers would be mechanical, chemical, restoration of land by useful tree species, rehabilitation of biodiversity growing in the area, and classical biological control and control by utilization.

**Literature cited**


