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COMPETITIVE REPLACEMENT OF OBNOXIOUS WEEDS *PARTHENIUM HYSTEROPHORUS* THROUGH SOME INDIGENOUS, TRADITIONAL & MEDICINAL WILD WEEDS, IN ITS NATURAL HABITAT OF MALWA REGION, MADHYA PRADESH (INDIA).

Aarti Chouhan[1]* & Rajmal Singh Rao[1]**

[1]Department of Botany, Government SBN, P.G. College Barwani (M.P.) INDIA

Email: aarti8090@gmail.com & rajmalsingh.rave@gmail.com

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Abstract:

A field experiment has been conducted to assess the potential of some medicinally important weed plant species viz. Cassia tora, Cassia occidentalis, and Achyranthus aspera on the removal of Congress grass. Parthenium necessary grass evil in herbs; it can cause toxic effects and serious diseases on human and animal health. Parthenium hysterophorous is a strong intraspecific competitor for native natural weeds and all herbaceous plants. It is a worldwide problem because native herbaceous plants reduce day by day through intraspecific competitive activity. The authors have traced and surveyed this problem and selected local native plant species viz. Cassia tora, Cassia occidentalis, and Achyranthus aspera, and conducted experiments for three consecutive years (2009, 2010, and 2011) in the Malwa region of Madhya Pradesh India. During the three years of the study period, observed (20) significant reduction in the density of obnoxious Parthenium weed by producing fast competition through selected all three native weeds and respectively by increasing the density of C. occidentalis (5.84) < C. tora (5.1) < A. aspera (3.3).

Keywords: *Achyranthus aspera, Cassia tora, Cassia occidentalis,* Congress grass, *Parthenium,* and Obnoxious weeds.

Corresponding author:

Dr. Aarti Chouhan

Department of Botany, Government SBN, P.G. College Barwani (M.P.) INDIA

Email: aarti8090@gmail.com & rajmalsingh.rave@gmail.com

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INTRODUCTION:

Inventive *Parthenium hysterophorus:*

Parthenium hysterophorus L., commonly called carrot grass, congress grass, or white top, in India is an herbaceous erect and annual plant belonging to the family *Asteraceae* (*Composite*) and one of the aggressive obnoxious (Oudhia, 2000). The origin of *Parthenium* is considered to be Mexico, America, and Argentina. Within the last 100 years, it has found its way to Africa, Australia, and Asia., In Australia and India *Parthenium* has achieved the status of "worst weed". It's surmised that *Parthenium* possibly got entry from the USA through the imported food grains (Vertak, 1968). In most publications, the occurrence of *Parthenium* in India has believed to be in 1956 when it was first noticed by a retired horticulturist Prof. Paranjape and described by Rao (1956). However, some reports trace its history of occurrence about one and half-centuries older than as reported by Rao (Roxburgh, 1914, Bennet et al., 1978., Maiti, 1983). Its presence in India before 1956 gets further confirmation from an herbarium record collected by Dr. Brandis in 1880 in Forest Research Institute, Dehradun India. In Australia, *Parthenium* infests around 170000 Km2 of the most grazing country Queensland causing an economic loss of around A$16.5 million per year to the pasture industry (Chippendale and Panetta, 1994). Another problem due to *Parthenium* seeds produces and total habit change in native vegetation (Chippendale and Panetta.,1994). The obnoxious weed shows a drastic impact on other plants that are strong competitor areas health hazards in humans and animals (Narasimhant et. al. 1977, Rajkumar et al 1988; Evan 1997; Handa et. al., 2001; Mohammad Nadeem et. al., 2005: Sharma et. al., 2004: Laxmi and Shrinivas, 2007). Various record has been done regarding the entry of this species into the Indian subcontinent (Roxburgh, 1914., Rao 1956; Bhan et. al., 1997, Ravindra and Bhumnnavar, 2005; Kphli et. al., 2006). However the reports of national herbaria institutes authors recorded the species introduced into the country around 1810. (Bennttes et. al., 1978; Kohli et. al., 2006).Though the weed remained uncommon and dormant during its early entry sooner it attracted researchers in the field of botany and ecology being a strong competitor for native species and developed as an ecological solution (Singla 1992, 2000; Mahadevappa, 1997; Odhia, 2000). This toxic invasive species with deep penetrating roots and erect shoot established itself rapidly in the alien environment suppressing the growth of native indigenous species with its allelopathic effect (Kohli and Rani 1994; Hierro and Callaway 2003; Senthil et. al., 2005). The species interferes with the growth of the other species by producing and releasing chemicals like phenolic acids sesquiterpenes (Picman and Pickman, 1984; Kohli and Batish, 1994), and other residues (Singh et. al., 2003). In 2003 revealed a remarkable reduction in the dominance of *P. hysterophorus* whereas other plant species were abundant and dominant (Asha Kumari, 2007).

Selected Important Native Plants Species:

Cassia tora (*cassia obstusifolia*) is a common herbaceous annual occurring as a weed throughout India and belongs to the family *Fabaceae* and subfamily *Caesalpiniaceae* shown metabolic extracts of *Cassia tora* improved microbiological safety by detoxifying aflatoxin B, *Cassia tora* leaves and seeds are acrid, laxative, antiperiodic, anthelmintic, ophthalmic, liver tonic cardiotonic and expectorant and its seeds are useful for leprosy, ringworm, flatulence colic, dyspepsia constipation & (Meena et. al., 2010). The seeds of *Cassia tora & Cassia occidentalis* have been shown to contain a high amount of protein and essential amino acids.

Cassia occidentalis is more commonly known as "coffee weed", and belongs to the family Caesalpiniaceae. It is an erect, shrub. The leaves are pubescent and are 3 to 6 cm long. The most widely used species *cassia occidentalis* useable as medicine (Kudav & Kulkani 1974). ***Achyranthes aspera*** is an important plant for traditional and medicinal uses. An ethnic group through the old medicinal system recorded 23 medicines from *A. aspera.* Many important uses of *A. aspera* in medicine like antimicrobial and anti-inflammatory.

Methodology:

For the study, we selected three indigenous wild weed species viz. *Cassia tora L., Cassia occidentalis, L.* and *Achyranthus aspera L.* For the removal of *Parthenium hysteophorus* seeds of all these three species seeds were collected in the season before the application (2008-09) in sufficient quantities. 10 different spots were selected for the present study and observations select 10^2 M. in the wasteland area these are *Parthenium hysterophorus* is highly dense grown. The seeds of selected weeds were introduced and spread on the spots an average of 100 seeds/spot for the conducted interspecific competition. Present studying the changes in the plant community quadrate method has been applied. The quadrate of size 1^2 M. was thrown randomly 10 times in each spot. The results were subjected to statically analysis during the years 2009, 10, 11, (Jones, L.V., and Tukey, J. (2000). A sensible formulation of the sign.

Geographical Map of Site:

Figure: Showing various photographs of *Parthenium hysterophorus, Cassia, Cassia oxydentalis, and Achyranthus aspera* plants and seeds in their natural habitats.

RESULTS & DISCUSSION:

In the previous investigation, the *P. hysterophorous* was highly abundant and grown on the selected spots. Generally, P. *hysterophorous* is dominant on all herbaceous we are grown during the rainy season. Invasive species are recognized as one of the major threats to native species and ecosystems around the world. Invasive species are of concern because of their capability of spreading fast, their high competitiveness, and their ability to colonize new areas within fast and short periods. The nature and severity of the impacts of these species on society, economic life, health, and national heritage are of global concern.

Parthenium is capable of germination and setting up itself at any time in the year and has the potential capability to grow vigorously even in summer (Dhileen, 2009). It inhabits any type of land apart from its proliferation in the wasteland, roadsides, railway tracks, graveyards, backyards, or vacant site (Raju, 1998; Mahadevappa and Gautam, 2005). Th number of investigators (Senthil et al., 2005; Krishna Reddy and Bryson, 2005; Asha Kumari et. al., 2010). Parthenium was introduced into Asia, Africa, and Oceania with cereal and grass seed shipment from America during the 1950s (Bhowmik and Sarkar, 2005), and currently, the weed is widely distributed and become problematical in countries such as Australia, India, China, Kenya West Indies, Australia, Ethiopia, Israel, Taiwan, India, Nepal (Picman and Picman 1984; Peng et. al. 1988; Mishra 1996; McFadyen 1992; Evans 1997; Tiwari et. al., 2005; Bhowmik et. al., 2007; Dhileepan 2009). The weed has achieved major weed status in India and Australia only within the last few decades (Navie et. al., 1996; Evans 1997; Mahadevappa 1997; Kaushik et. al. 2005; Bhowmik et. al., 2007). *Parthenium* is of particular concern because of its invasive and allelopathic properties: (1) It is an aggressive colonizer that gets established in natural and manmade ecosystems, grassland habitats, open woodlands, river banks, flood plains, wildlife parks, open fields of settlements areas, bare areas along roadsides, crop fields, gardens heavily stocked areas around yards and watering points etc. (McFadyen 1992; Chippendale and Panetta 1994; Tamado and Milberg 2000; Pandey et al. 2003;) it produces large amounts of seeds and thus, it has the potential to become widespread, the allelochemicals released directly from the weed or from seed leaching inhibit germination of other plants and the growth of pasture grasses, legumes, cereals, vegetables, other weeds, and even trees (Oudhia 2000 a,b) it induces changes in the physical and chemical properties of soil such as soil texture, soil pH, soil organic matter, soil nitrogen, soil potassium, soil phosphorus etc. (Bhowmik et al. 2007); it is noxious and unpalatable to herbivores it replaces rangelands palatable grasses and adversely effecting animals' health damaging milk and meat quality manual removal is difficult because it may cause dermatitis, hay fever, asthma, allergic and even death in humans (Navie et al 1996; Evans 1997; Oudhia 2001a; Bhowmik et al. 2007). An impartment attempt for Competitive replacement and minimize of obnoxious *P. hysterophorous* by some traditional and medicinal native species viz. *Cassia tora, Cassia occidentlis, Achyranthes aspera*, during the study periods a dynamic individual and commonly experiment conducted of *P. hysterophorous V/S* all the selected native weed species and occurred following great results.

1a. *Parthenium hysterophorous* V/S *Cassia tora;*

During the initial stage the *P. hysterophorous* was 100% frequent, the me density and abundance of 85 m² were recorded. In this regard the *Cassia tora* was found 60 % frequent and density, abundance 7 m², 11 m² respectively. In the second-year study period the *P. hysterophorous* was 90%,55 m², and 63 m² frequent, density and abundance and in third year found 70% ,33,47 m², frequent, density and abundance respectively significantly decrease and in this duration. The *cassia tora* was found in the second & third year 80%, 35, 43 m², & 80% 40, 50, m² respectively significantly increase on the spot. *Parthenium* habitats include: allergenic responses, dermatitis, hay fever, and asthma caused humans disease.

Table & Graph-1: Showing *Parthenium hysterophorus* V/S *Cassia tora* % F.D.A. of selected plant species spot=1

Year	Plant Species	Frequency	Density	Abundance
	P. hysterophorus	100	8.5	85
First	*C. tora*	60	0.7	11
	P. hysterophorus	90	5.5	63
Second	*C. tora*	80	3.5	43
	P. hysterophorus	70	3.3	47
Third	*C. tora*	80	4.0	50

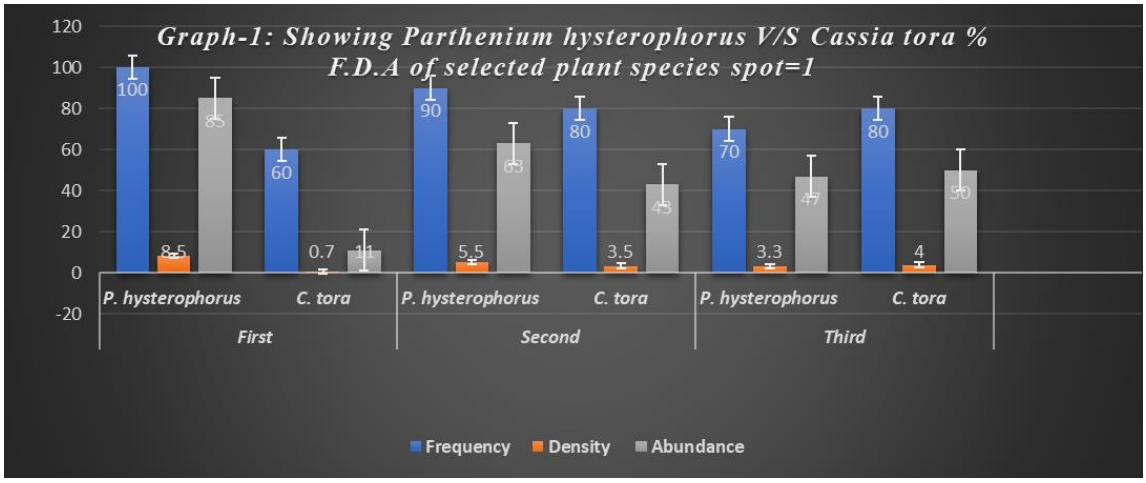
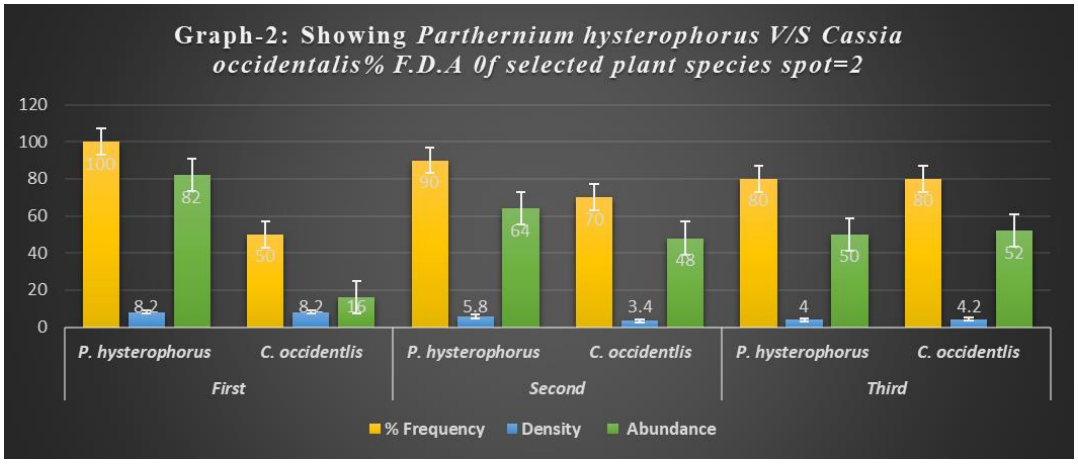


Table & Graph-2: Showing *Parthenium hysterophorus* V/S *Cassia occidentalis* % F.D.A. of selected plant species on Spot=2

Year	Plant Species	% Frequency	Density	Abundance
	P. hysterophorus	100	8.2	82
First	*C. occidentlis*	50	8.2	16
	P. hysterophorus	90	5.8	64
Second	*C. occidentlis*	70	3.4	48
	P. hysterophorus	80	4.0	50
Third	*C. occidentlis*	80	4.2	52

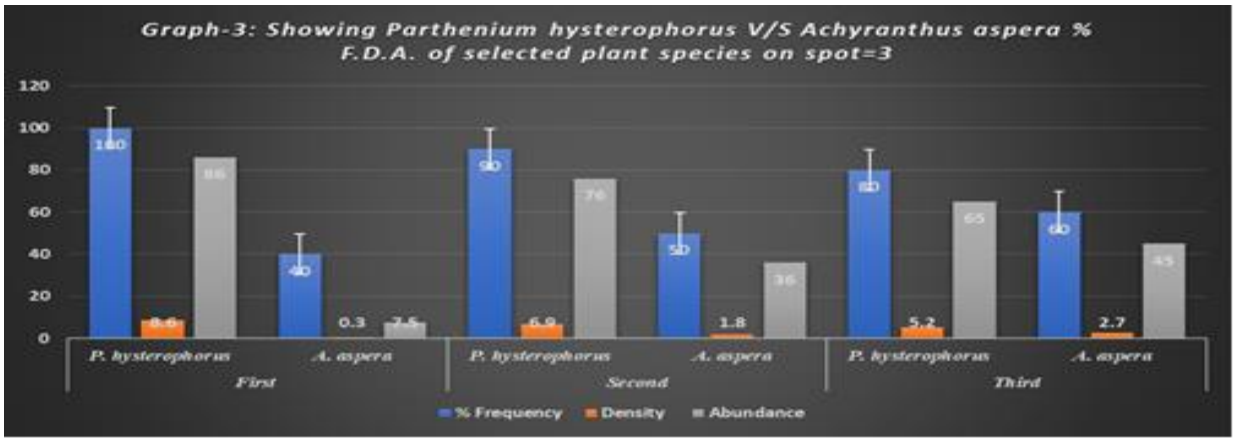


Spot-2b. *Parthenium hysterophorus* v/s *Cassia occidentalis*:

In the first-year observation of *P. hysterophorous* v/s *Cassia occidentalis* interspecific competition results were found to be replaced trends. The % frequency of *P. hysterophorous* was the same reduction to be found in studied the three years where experiment 1a, density & abundance were 82, 58, 54 m² & 82, 64, and 50 m², respectively decreasing trends recorded during first, second and third year. In this duration the Cassia occidentalis was increasing trend to be found and that was recorded 50, 70, and 80, % frequency, density & abundance was 8.2, 34 and 42 per m² & 16, 48 and 52 per m² was increasing trend in the first, second and third year respectively.

Table & Graph-3: Showing *Parthenium hysterophorus* V/S *Achyranthus aspera* % F.D. A. of selected plant species on spot=3

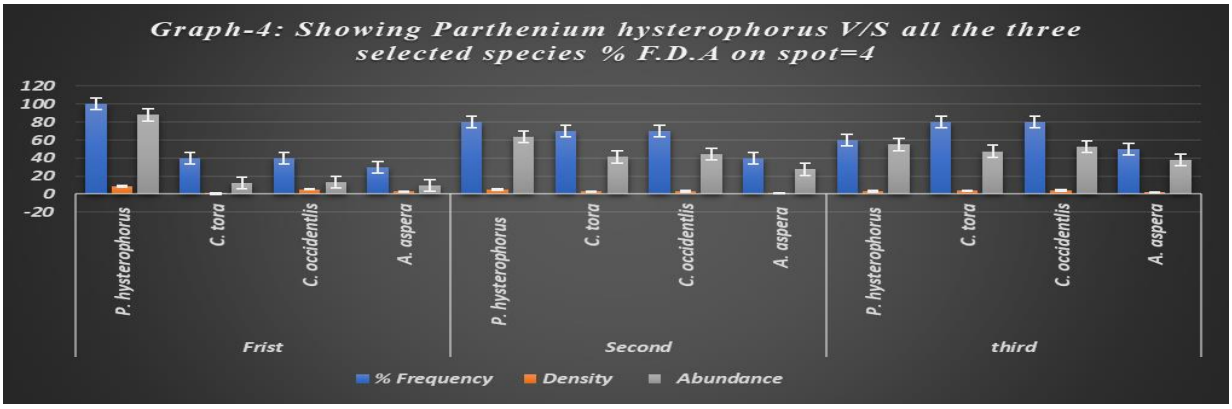
Year	Plant Species	% Frequency	Density	Abundance
	P. hysterophorus	100	8.6	86
First	*A. aspera*	40	0.3	7.5
	P. hysterophorus	90	6.9	76
Second	*A. aspera*	50	1.8	36
	P. hysterophorus	80	5.2	65
Third	*A. aspera*	60	2.7	45



Spot-3c. *Parthenium hysterophorus* V/S *Achyranthus aspera*:
The ***Achyranthus aspera***; were found to be significantly increasing during the study period in the spot interspecific competition with P. hysterophorous. these Achyranthus aspera was to be found increasing trend as recorded 40, 50 and 60 m² percentage frequency, density was recorded 3, 18 and 27 m², abundance observed 7.5, 36 and 45 m² in the first, second, and third year respectively during the study periods. In the presence of Achyranthus aspera the P. hysterophorous was recorded decreasing trend as % frequency 100, 90 and 60 m², density was 86, 69 and 52 m², abundance 86, 76 and 45 m² was recorded in the first, second and third year respectively It spreads easily through trade as contaminants of grain and other crop products and by means of farm machineries.

Table & Graph -4- Showing *Parthenium hysterophorus* V/S all the three selected plant species % F.D.A. in spot=4

Year	Plant Species	% Frequency	Density	Abundance
Frist	*P. hysterophorus*	100	8.8	88
	C. tora	40	0.5	12.5
	C. occidentlis	40	5.3	13.25
	A. aspera	30	2.9	9.66
Second	*P. hysterophorus*	80	5.1	63.75
	C. tora	70	2.9	41.42
	C. occidentlis	70	3.1	44.28
	A. aspera	40	1.1	27.5
third	*P. hysterophorus*	60	3.3	55
	C. tora	80	3.8	47.5
	C. occidentlis	80	4.2	52.5
	A. aspera	50	1.9	38



Spot-4d. *Parthenium hysterophorus* V/S selected all three species:

Experiment conducted commonly with all three native weeds; in previously the *P. hysterophorous* was dominant but application and introduced selected species for these. The *P. hysterophorous* was reduced % frequency as 100, 80 & 60 m² density was 88, 51 & 33 m² abundance was reduced as 88, 63.75 & 55 m² during first, second & third year. Where the Competitive replacement response cassia species was being strong and *A. aspera* was less strong with presence of *P. hysterophorous* in weeds community on the spot and increasing trends found of all the selected weed plants. The *Cassia occidentalis* was highly increasing trends was recorded 40, 70 & 80 % frequency, density was 5.3, 31 & 42 m² abundance 13.25, 44.28 & 52.5 m² was recorded during first, second- & third-year investigation. From these observations it is clear that any species, which grows faster than others, produces thick canopy, becomes taller, occupies more space, becomes physically and ecologically dominant and is capable of inhibiting or even eliminating the other species (Bryson, 2003; Krishna reddy and Bryson, 2005). Similarly, a species has capacity of holding tenancy of its micro site longer gets a helpful over the others, which vacate their microhabitats periodically (Huston, 1994). Where *C. tora* was observed 40, 70 & 80 % frequency and density and abundance was 5, 29 & 3 m²8, and 12.5, 41.42 & 47.5 m² during the study periods. When competition occurs between equally strong competitors, it results in a scramble type of competition but in the present case it may be classified as a contest type (Harper, 1977). Contest type of competition leads to the elimination of the weaker species by competitive elimination (Gause's principle: Gause, 1934). In the first, second- & third-year study period the increasing trend was recorded of *A aspera* as found 30, 40 & 50 % frequency, density was increase as 2.9, 11 & 19 m² and abundance 9.66, 27.5 & 38 m²was recorded during the first, second- & third-year study periods. In recent past, this approach gained momentum after reports that *Cassia sericea* (*C. uniflora*) can be used to control *Parthenium* (Mahadevappa and Ramaiah, 1988). *Cassia sericea*, non nitrogen fixing leguminous plant was suggested to be used by adopting two approaches namely maintaining of naturally occurring biodiversity and planting of species in target area (Mahadevappa, 1996). In this approach, two apprehensions were observed by (Balyan et. al., 1997) (a) In planting of *C. sericea* in areas of Parthenium dominance, in the beginning, *Parthenium* has to be removed physically and mechanically and there are limitations of uprooting Parthenium in undulating areas (b) to remove one weed (carrot weed), another weed (*Cassia)* has to grow, which may also pose danger to field crops and orchards in coming years. In Jabalpur (M.P., India), suppression *Parthenium* marigold showed encouraging results and this practice was also advocated for *Parthenium* suppression (Kauraw and Bhan,1995b). *Parthenium* is more stable compared to native weeds plants but its life span is short duration because present selected native weeds dominant on obnoxious weed behind the reason native have long life span of *Cassia tora*, *Cassia Occidentalis*, Achyranthes *aspera*. *Cassia* is more dominant because it has a big leaf area and much chlorophyll resulting in photosynthesis activity strong, another reason it has made dominancy it has moisture and water abortion capacity, similar characteristics belonging to all selected native weeds.

Competitive Response of Indigenous weeds; Reports from various countries suggest that *Parthenium* is open spreading and may become dominant in other parts of the world shortly (Evans 1997; Kaushik et al. 2005; Dhileepan 2009) In tropical and subtropical countries of the Indian, African and Australian, there is increasing concern on these adverse effects on productivity and biodiversity human health, livestock, agriculture (Dhileepan 2009).

CONCLUSION:

The study proved that the Competitive study of obnoxious weed *Parthenium* with indigenous native weeds *Cassia tora, Cassia occidentalis,* and *Achyranthes aspera* all three native weeds capable to remove and replace of toxic weeds *Parthenium* through competitive preplacement. This type of study more effective and useful for the replacement of *Parthenium*, it can be applying many areas there is very heavily dens grown toxic *Parthenium*, but one of our biggest challenges is how we more and more use our native weeds. To develop our weeds, use technology and extension and more effective and useful. Many Institutions and researchers have conducted programs minimization the competitive replacement of toxic *Parthenium* weeds through the native weeds.

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