

**IMPACT OF *PARTHENIUM HYSTEROPHOROUS* L. INVASION ON  
SOIL AND PLANT SPECIES COMPOSITION OF GRASSLANDS IN  
CENTRAL NEPAL**

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## ABSTRACT

The present study was undertaken in three grasslands each in Gorkha, Nuwakot and Kathmandu districts where invasion of *Parthenium hysterophorus* L. (here after referred to as *Parthenium*) was at initial stage (5-6 years). The research was focused on the change in physico-chemical properties of soil and plant community structure (species richness, density and important percentage) due to *Parthenium* invasion. The field sampling was done from August to September 2006. In each study site, ten belt transects (size 13 m × 1 m) were defined passing from non invaded part to invaded. In each transect, five quadrats of 1 m × 1 m were sampled at interval of 2 m in such a way that two quadrats lied on invaded, one on transition and two on non-invaded regions. In total 150 quadrats (50 in each study site) were sampled. Soil samples collected from each sampling plot were analyzed for texture, pH, organic matter (OM), total nitrogen (N), available phosphorus (P) and available potassium (K).

The soil type was sandy loam in Gorkha, pure loam or sandy loam in Nuwakot and sandy loam or silt loam in Kathmandu. The pH in invaded plot ranged from 5.92-6.73 and in all three sites pH declined from non-invaded plots to invaded plots with slightly acidic or neutral soil. Soil OM and soil N content did not change significantly due to *Parthenium* invasion. Soil K increased from non-invaded to invaded plots. However, K content increased due to *Parthenium* invasion at initial stage but it declined with increasing *Parthenium* density. There were a number of trends in changes in soil properties that might be due to heterogeneous nature of habitat, instead of *Parthenium* invasion.

Plant species richness was high in invaded plots of Gorkha and Kathmandu sites and there was no change in species richness from non-invaded to invaded plots in Nuwakot site. Plant species richness was high in invaded plots probably due to increase in habitat heterogeneity at initial stage of invasion. The non invaded plots in all sites were dominated by *Acrachne racemosa* which formed continuous mat and suppressed the growth of associated species. *Parthenium* lacks such type of network but creates shaded condition which favours growth of other plant species under dense canopy at ground level. Dominance shifted from *Acrachne racemosa* to *Parthenium* and density of associated species declined with increasing *Parthenium* density. Many palatable species (*Acrachne racemosa* (Heyne) Ohwi., *Trifolium repens* L., *Imperata* sp., *Chrysopogan aciculatus* (Retz.) Trin., *Sporobolus* sp. and *Dactyloctenium aegypticum* (L.) P. Beauv.) were negatively affected by *Parthenium* invasion. Thus protection of grazing lands from *Parthenium* invasion is important to ensure sustainable supply of fodder to livestock.

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## LIST OF ABBREVIATION AND ACRONYMS

°C	- Degree Centigrade
asl	- Above sea level
ANOVA	-Analysis of variance
DOHM	- Department of Hydrology and Meteorology
DPR	- Department of Plant Resources
E	- East
IP	- Importance percentage
IUCN	- The World Conservation Union
IVI	- Importance Value Index
K	-Potassium
KATH	- National Herbarium, Godawari, Kathmandu
NARC	- National Agricultural Research Council
OM	-Organic matter
P	- Phosphorus
RC	- Relative coverage
RD	- Relative density
RF	- Relative Frequency
SPSS	- Statistical Package for Social Sciences
TUCH	- Tribhuvan University Central Herbarium, Central Department of Botany