

The Invasive Weed *Parthenium hysterophorus* and Its Management in Eastern Africa

Wondi Mersie, Virginia State University, Petersburg, Va. and Jenipher Bisikwa, Makerere University, Uganda

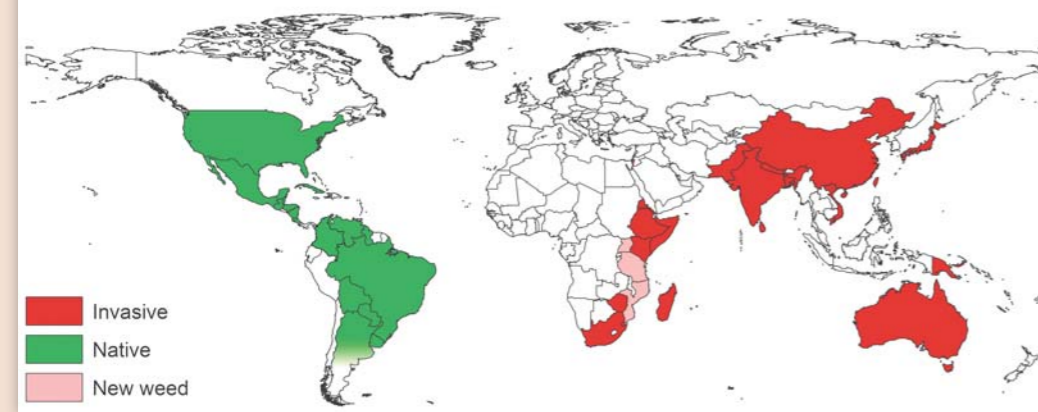


The invasive alien weed, *Parthenium* (*Parthenium hysterophorus*), a native of North and South America, was accidentally introduced to East Africa in the early 1970s and now has established itself in Ethiopia, Kenya, Somalia, Uganda, and Tanzania in eastern Africa. CLIMEX modeling shows that it could spread throughout Sub-Saharan Africa.

Distribution

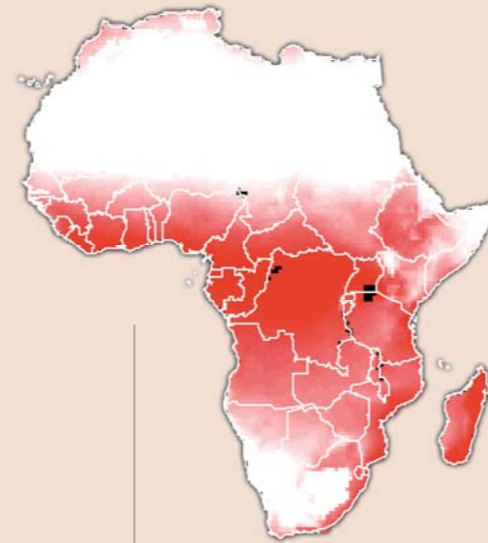
This New World weed has established itself in Australia, India, Nepal, Bangladesh, Pakistan, Sri Lanka, Taiwan, Vietnam, South Africa, Zimbabwe, Mozambique, Swaziland, Madagascar, Tanzania, Uganda, Kenya, Ethiopia, and Somalia.

2010 Distribution of *Parthenium* Weed



Uganda. Green weed-shaped markers show where the weed *Parthenium* has been found.

Tanzania. Red and green markers show locations tested for *Parthenium*. Red markers indicate the weed's presence.



CLIMEX-generated map of the relative climatic suitability of Africa for *Parthenium hysterophorus*. Red shading depicts the ecoclimatic indices (suitability of each location); the darker the red shading, the more suitable the area for *Parthenium*.

Biology

The plant is an annual herb with an extensive root system. It can grow to a height of 0.5 to 1.5 m. It grows well in disturbed habitats, such as roadsides, railway tracks, stockyards, around buildings, and fallow agricultural fields. The whole lifecycle takes 6–8 weeks, and there may be up to four generations per year. A single plant can produce up to 25,000 seeds.



Effect on Biodiversity

Parthenium is highly allelopathic, and it suppresses plants growing adjacent to it. Chemicals released from its roots inhibit germination of seeds of pasture grasses, cereals, vegetables and others. By displacing plant diversity in an area, it forms large monoculture stands.

Yield Loss

Parthenium caused 40 percent yield loss in sorghum in Ethiopia. It competes with preferred pasture species, reducing pasture carrying capacity by up to 90 percent. It has tainted mutton, milk, and beef when sheep and cows fed on *Parthenium*-contaminated feed.

Health Risks

Parthenium pollen causes asthma, bronchitis, and hay fever in humans. Contact with any part of the plant often causes dermatitis with pronounced skin lesions in human beings and domestic animals.



Control Methods

Mechanical Control

In small-scale subsistence farming, *Parthenium* is currently controlled by hand weeding. The task is primarily done by women and school-age children. Slashing and burning have been largely ineffective because of the high seed production, wide range of adaptability, and regeneration from stumps.



Chemical Control

Use of herbicides for control of *Parthenium* that grows on roadsides, vacant lots, and nature preserves is expensive, results in non-target effects, and is not practical. Herbicides are also too expensive for subsistence farmers in eastern Africa. Further, their effect is temporary and requires repeated applications.

Biological Control

An IPM CRSP supported project in Ethiopia is screening an insect biological control agent, a beetle, proven successful against *Parthenium* in Australia and India. Since *Parthenium* is an introduced plant in those countries, researchers had adopted this classical biological control approach and found encouraging results. When released, the adult and larvae *Zygogramma bicolorata* fed on the leaves and flowers of *Parthenium*, and were both effective against the weed and safe to non-target plants.



Host specificity tests conducted under quarantine conditions at Ambo, Ethiopia confirmed that *Z. bicolorata* is specific to *Parthenium* and does not feed on any economical and native plants in eastern Africa. Currently, IPM CRSP is preparing an Environmental Assessment for permission to use USAID funds for the field release of this agent; the government of Ethiopia has already granted permission for the project.