

## INVASIVE SPECIES

# The Threat of Alien Species to East Africa's Ecosystems

How invasive species are driving biodiversity loss, economic strain, and environmental change across the region



STORY BY  
**FELIX PATTON**

## BELOW

An invasion of Lake Victoria by alien water hyacinth.

**B**iodiversity loss and species extinctions are increasingly driven by the invasion of alien species in protected areas and most natural ecosystems.

According to an \*IPBES report, invasive alien species have contributed either solely or in part to 60 per cent of recorded global extinctions, and they are the primary driver in 16 per cent of documented global animal and plant extinctions. In 2019, the global annual costs of biological invasions were estimated to exceed \$423 billion, with negative effects on the economy, food security, water security, and human health.

Invasive alien species (IAS) can include plants, diseases, insects, or animals introduced into a new environment without their natural controls. Human activity, whether intentional or unintentional, is often involved. Climate change, through extreme climatic events such as floods, droughts, hurricanes, and wildfires, has accelerated the speed and extent of invasions and their impact. The ease and frequency of international travel and trade have increased the chances for IAS to establish themselves in new territories.

Invasive species do not recognize boundaries, and once established, they can





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spread across continents unchecked. As it is unrealistic to expect border security to stop the spread, East Africa has its share of problems. Lake Victoria, which spans Kenya, Uganda, and Tanzania, is plagued by the water hyacinth (*Eichhornia crassipes*). A native of tropical America, this plant has been in Africa, particularly in the River Nile, since the 1870s, although it was not reported in Lake Victoria until 1989. By the early 1990s, the problems became apparent, and by 1995, 90 per cent of the Ugandan shoreline was covered by the plant.

The weed dominates the lake’s surface, hampering fish and other aquatic life. Some fish species have disappeared, and many landing sites along the lakeshore have been blocked. Pythons and cobras have even been found in stranded fishing boats. Millions of dollars have been spent on its control. In Tanzania, biological control agents known as *Neochetina eichhorniae* have been reported to be successful, while in 2018, two biogas digesters were installed in the village of Dunga in Kenya. Beaches have been manually cleaned up as well.

In the 1950s, Nile perch was introduced into the lake as a management measure to utilise *Haplochromis* species—ray-finned fish that were abundant, commercially unimportant, and almost regarded as ‘trash fish.’ However, the presence of perch has led to the disappearance of several indigenous cichlid species. The native cichlids were

traditionally sun-dried, but Nile perch, with its higher fat content, needed to be smoked to avoid spoiling. This led to an unintended consequence: increased demand for firewood in a region already hard-hit by deforestation, soil erosion, and desertification.

Rangelands and community land in the arid and semi-arid areas of Kenya and Tanzania are threatened by the invasion of the prickly pear cactus (*Opuntia*). Originally from Central America, the Caribbean, and parts of the United States, it was introduced to Kenya by British colonialists in the 1940s as a ‘living fence.’ The cactus reduces grazing areas and is harmful to domestic animals. Control methods include uprooting the weed manually or introducing a sap-sucking insect that feeds on the cactus. However, the invasive cactus continues to spread, aided by wildlife such as elephants and monkeys that eat the edible fruits and disperse the seeds through defecation.

Despite its invasive nature, the cactus does have human benefits, including the production of wine, marmalade, and jam. In

**TOP LEFT**

The Nile perch (*Lates niloticus*) is a large freshwater fish native to the Nile River and other parts of Africa.

**TOP RIGHT**

*Opuntia* known as prickly pear cactus.

**BOTTOM LEFT**

An early invasion of *Opuntia* in Laikipia, Kenya. The plants will quickly be spread by wildlife that eat the edible fruits and defecate the seeds throughout the area.

**BOTTOM RIGHT**

Dodder (*Cuscuta* spp.) suppresses trees and shrubs essential for wildlife to feed on.

## CONSERVATION



PHOTO BY SA PLANTS



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### TOP LEFT

An elephant struggles through an invasion of alien sickle bush.

### BELOW LEFT

Sodom apple. Despite its name and appearance, the Sodom apple is not related to the traditional apple (*Malus domestica*) and is actually quite toxic. The fruit and leaves contain solanine, a toxic alkaloid that can cause nausea, vomiting, and other symptoms if ingested.

### TOP RIGHT

Grassland invaded by alien species at Ziwa Rhino Sanctuary, Uganda.

### BOTTOM RIGHT

Good quality grass, ideal for the sanctuary's white rhinos, exposed following the clearing of the invading alien species.

some instances, it is also medicinal. It can be shredded, dried, and mixed with other fodder for livestock.

In the arid lands of northern Kenya, *Prosopis juliflora* has formed thorny, impenetrable thickets, especially along watercourses, floodplains, pasturelands, and inhabited areas. This small, fast-growing, drought-resistant evergreen tree of tropical American origin was introduced in the 1980s and early 1990s as part of afforestation, fuel-energy, and fodder programmes, but it has proven to be more aggressive than native species.

Dodder (*Cuscuta* spp.) is rapidly spreading across Kenya, especially in the Eastern, Western, and Rift Valley regions. It poses a significant threat to trees, shrubs, hedges, and cash crops such as tea and coffee. The weed is easily spread by birds that consume its seeds, and manual destruction is the most effective control method.

Kidepo National Park, the third largest in Uganda, is threatened by an invasion of the legume plant known as 'sickle bush' (*Dichrostachys cinerea*). Unpalatable to most animals, the plant suppresses other vegetation and has rapidly colonised the park's two northern valley areas. Local communities are being employed to uproot the invasive plants.

A multitude of other plant species are considered alien and invasive as they outcompete native species, particularly affecting grasslands. In Ziwa Rhino Sanctuary in Uganda, two species—*Lantana camara* and *Calotropis procera* (better known as Sodom Apple)—became serious problems, reducing the quantity of grass available to the only wild white rhino population in the country. Local community members were recruited to manually clear infested areas, creating short grass grazing lawns quickly utilized by the rhinos.

In East African forests, many native species have been overtaken by introduced species. Spanish Cedar (*Cedrela odorata*) was introduced to the Kimboza Forest Reserve in Tanzania in 1957 and 1960 as a fast-growing tree species for timber and firewood. It has since colonised a large part of the forest, crowding out native species and nearly replacing indigenous tree species. If uncontrolled, *Cedrela odorata* poses a threat to other Eastern Arc forests.

Miombo woodlands, which cover nearly half of Tanzania, are threatened by the invasion of *Acacia polyacantha* and *Acacia nigrescens*. Meanwhile, *Senna spectabilis*, a tree native to South and Central America, has become invasive in Mahale Mountains National Park.



PHOTO BY DICK CULBERT



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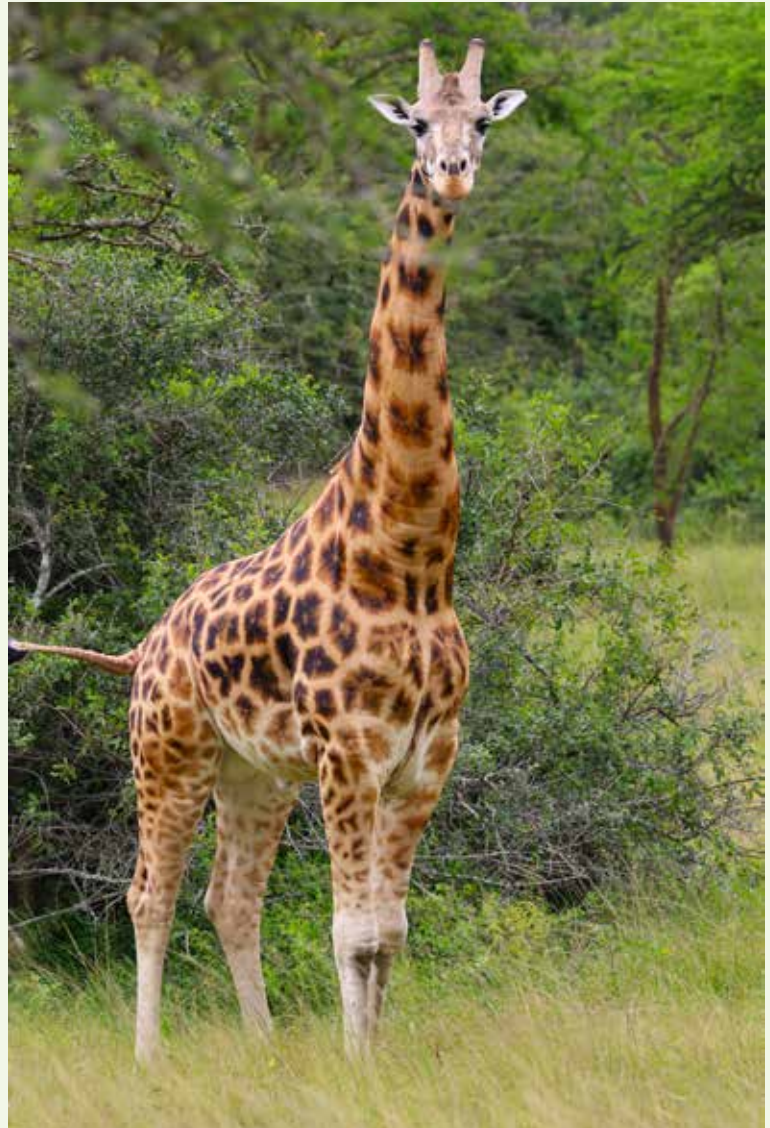


PHOTO BY MICHAEL BROWN

Introduced for resources such as firewood and to combat deteriorating ecosystems affected by deforestation and desertification, this species is now overtaking native tree species in forest ecosystems due to its rapid growth.

In the Ngorongoro Conservation Area of Tanzania, alien species, particularly *Datura stramonium* and *Argemone mexicana*, are believed to have been introduced through the importation of construction materials, especially sand from Karatu town.

Acacia species, especially *Acacia hockii*, are indigenous to Lake Mburo National Park in Uganda but started rapidly multiplying and colonising the area in the 2000s. By 2012, it was officially acknowledged that acacia had become a dangerous invasive species. The open savannah was transforming into closed woodland, full of thickets that were generally unsuitable for herbivores, which could not access food and water. In 2015, the Uganda Wildlife Authority (UWA) moved 15 giraffes into Lake Mburo National Park to feed on the acacia. Although their numbers have risen to 70, it is estimated that acacia now covers around a third of the park. To open up the thicket, UWA allows local communities to clear the trees, either for firewood or to convert the wood into charcoal for sale.

In Tanzania, measures used to control invasive tree species include cutting and uprooting them to prevent regeneration, as is done in Kilimanjaro and Arusha National Parks. Stripping off the bark of trees—either the basal portion or below cutting height—has been found effective in killing the umbrella tree (*Maesopsis eminii*) in the Usambara Mountains. Invasive trees may also be cut and treated with chemicals.

An example of an invasive bird species is the Indian house crow. Arriving in Kenya in 1947, the Indian house crow multiplied rapidly. Today, there are hundreds of thousands in Kenya's coastal region, with some sighted inland in Emali, threatening other species. The aggressive crows eat other birds' eggs and displace them from their nests. In 2022, an efficacy test of the poison Starlicide successfully eliminated the crows. The poison metabolizes rapidly over 10 to 12 hours, so if a poisoned crow is found dead, it can be safely eaten by scavengers like dogs or

**TOP LEFT**

If uncontrolled, *Cedrela odorata* poses a threat to Eastern Arc forests.

**BOTTOM LEFT**

The aggressive Indian House Crow eats other birds eggs and take over their nests.

**RIGHT**

Giraffe have been introduced into Lake Mburo National Park, Uganda as one of the measures to open up bushland, particularly dominated by *Acacia hockii*, which has rendered areas unsuitable for grazing wildlife.

**Crematogaster ants strongly defend trees against elephants, which can otherwise have a dramatic negative impact on tree cover.**

vultures. Although Starlicide is currently the only effective control measure, it is not yet freely available.

Invasive insect species can indirectly affect ecosystem processes. Crematogaster ants strongly defend trees against elephants, which can otherwise have a dramatic negative impact on tree cover. In Laikipia, Kenya, the invasive big-headed ant (*Pheidole megacephala*), originally described in Mauritius, has established itself in numerous locations over the past 10-15 years. These ants can clear Crematogaster from acacia trees within hours, leading to an increase in the number of trees catastrophically damaged by elephants. One outcome of the vegetation opening up has been that the cleared areas made lions less effective at hunting zebra, their primary prey. While lion numbers have not declined, they may have switched their interest towards buffalo.

Overall, the most cost-effective options for IAS control are prevention and preparedness. For small and slow-spreading populations in isolated ecosystems, eradication has proven successful. Containment and control strategies can also be effective in managing invasive species. Adaptive management,



PHOTO BY BEN CHERRY

such as ecosystem restoration and reintroduction of native species, can further improve IAS management efforts. It is essential that these measures are implemented promptly and consistently to prevent the widespread environmental, economic, and social impacts of invasive alien species.

\*Thematic assessment report of invasive alien species and their control. Intergovernmental Platform on Biodiversity and Ecosystem Services (2023). ●

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**TOP**

Black-headed ants invading an acacia tree and killing the resident, beneficial crematogaster ants.

**BOTTOM**

Invasive alien species, such as white hibiscus (pictured), can make it difficult to monitor and so keep safe, even the larger species, like the endangered black rhino and once established, can be very difficult to remove.

PHOTO BY FELIX PATTON

