Introduction

Kariba Weed (Salvinia molesta) is an invasive alien waterweed that was first recorded in Uganda in sheltered bays of Lake Kyoga (Mitchell, 1969). This weedweed has become a common feature in Lake Kyoga and its associated rivers, streams and swamps (Figure 1) and has spread to other lakes notably Lwena and Albert (Figure 2), in addition to Lake Kivu in Bugun district.

Kariba Weed is a free floating waterweed that grows profusely and forms extensive dense mats over still or slow-moving waters (Fern & Harley, 1979). The rapid growth of Kariba Weed results into dense mats that cover the water surface and block light from penetrating the water column (Mitchell & Tar, 1970). Exchange of gases between the water surface and the atmosphere is also impaired (Figure 3).

Environmental impacts

Due to its rapid growth, with a biomass doubling time of less than four days, water quality beneath the mats becomes degraded through a decrease in dissolved oxygen and pH, and increase in CO2, and H2S (Mitchell, 1969). Seminconcentration and coating of the weed mass causes accumulation of organic debris at the bottom of the water body a process that threatens fisheries by creating a shallow-water environment less suited to fish breeding (Gulthrie, 1985). Floating of the weed mass greatly diminishes dissolved oxygen needed to support healthy fish populations and other organisms in the water (Oliver, 2003). Fishes such as Nile tilapia (Oreochromis niloticus) are common in near-shore or in the water (Oliver, 1993). Fishes such as Nile tilapia support healthy fish populations and other organisms mass greatly diminishes dissolved oxygen needed to fish breeding (Sculthorpe, 1985). Rotting of the weed by creating a shallow-water environment less suited to the water body, a process that threatens fisheries (Mitchell & Tar, 1970). Senescence and rotting of the weed mass results into dense mats that cover the water surface (Plate 2). Exchange of gases between the water surface and the atmosphere is also impaired (Figure 3).

Social impacts

Kariba Weed is now well established along much of the shoreline of Lake Kyoga, Lwena and Albert. Activities that are commonly done in the near-shore areas e.g. docking and boat take-off (Plate 3 a & b), water abstraction by lakeside communities (Plate 4 a & b) in addition to recreation, are negatively affected by the thick mats of this weedweed. Infestation by this waterweed also fouls watering points for livestock (Plate 5).

Infestation by Kariba Weed also creates micro-habitats that are ideal for disease vectors e.g. malaria-carrying mosquitoes and filariae worms. The weedweed also shelters mosquito species that are responsible for the transmission of encephalitis and dengue fever in the surrounding areas (Creagh, 1991/92). Kariba Weed also alters the natural beauty of open waters, such as dams, rivers and lakes by intercepting the open water surface (Plate 6).

Economic impacts

Kariba Weed is a pest of rice paddies where it competes for water, nutrients and space resulting in poor crop production. Infestation of this weed in rice paddies was noted along the shores of Lake Kyoga in Bugun district (Plate 7). The huge mass of Kariba Weed easily entangles fishing gears especially Gill nets (Plate 8) thus leading to poor fish catches and loss of the gear itself.

Recommendations:

1. The outcry of fishermen and the local communities as a result of Kariba Weed infestation is a signal that the environmental and socio-economic impacts of this weedweed are overwhelming in affected areas. This therefore calls for urgent interventions to control further spread and adjoining current infestations of this invasive weedweed in order to maximize use and sustainable exploitation of resources in affected waters.
2. Since Kariba Weed is a free floating waterweed that easily breaks under the influence of even slight winds, waves and water currents, mechanical control may not be the best option. Therefore biological control may be the best alternative (Patterson et al., 2003) since this approach is environmentally friendly and its sustainability is guaranteed. Worldwide, the Salvinia weevil (Cyrtobagous salviniae) (Plate 9) has been used to control this weedweed with remarkable success.
3. Fishing gears and associated equipments including outboard engines should not be transferred from the infected water bodies to water bodies free of Kariba Weed.
4. New infestations should be reported to authorities without delay. This will allow planning for immediate control interventions.

REFERENCES


Plate 1: An extensive mat of the Kariba Weed (Salvinia molesta) in the open waters of Lake Kyoga between Zengebbe and Namalasa landing sites (Courtesy of Wanda F.M., July 2015)

Plate 2: Map of the north-central zone of Lake Albert (a) and Lake Kwania (b) showing abundance and distribution of Kariba Weed. Infested areas of Kariba Weed are shaded in green. Infestation at Namasale on Lake Kyoga (Plate 2). Exchange of gases between the water surface and the atmosphere is also impaired (Figure 3).

Plate 3: Dissolved oxygen concentration gradient from the open water into the weed mat.

Plate 4: Water abstraction from lake communities (Plate 4 a & b) in addition to recreation, are negatively affected by the thick mats of this weedweed. Infestation by this waterweed also fouls watering points for livestock (Plate 5).

Plate 5: Watering points for domestic animals fouled by Kariba Weed (Plate 5). Infestation at Namasale on Lake Kyoga (Plate 5).

Plate 6: Diverse species of Kariba Weed intermingled with clumps of Kariba Weed (Plate 6). Infestation by Kariba Weed also creates micro-habitats that are ideal for disease vectors e.g. malaria-carrying mosquitoes and filariae worms. The weedweed also shelters mosquito species that are responsible for the transmission of encephalitis and dengue fever in the surrounding areas (Creagh, 1991/92).

Plate 7: Kariba Weed mats in rice fields in the shallower zones of Lake Kyoga (Courtesy of Amondito, B., May 2016).

Plate 8: Gill nets entangled by Kariba Weed at Kyoga landing site. Lake Kyoga, Amolatar District (Courtesy of Wanda F.M., July 2015).

Plate 9: Salvinia weevil (Cyrtobagous salviniae) (Courtesy of Wanda F.M., February 2016)