Weed Biocontrol

Above and below: *Biocontrol of water lettuce*

Invasive alien plants (IAPs) use up approximately 3.3 billion m^3 of water annually i.e. 7% of the water run-off in South Africa (see review paper by Wilge and de Lange, published in African Entomology (Vol 19, No. 2, 2011). This translates to an economic loss of 6.5 billion rands per annum when one considers the impact on water availability, grazing and biodiversity.

IT MAKES GOOD SENSE TO MAKE SIGNIFICANT INVESTMENTS IN CLEARING INVASIVE PLANTS, ESPECIALLY IN LIGHT OF THE FACT THAT SOUTH AFRICA IS A WATER SCARCE COUNTRY WHERE DEMAND ON WATER RESOURCES IS EXCEEDING SUPPLY. WHILE MANY IAP CONTROL PROGRAMMES MAKE USE OF CHEMICAL AND MECHANICAL MEANS OF CONTROL, IN THE PAST TWO DECADES BIOLOGICAL CONTROL HAS ESTABLISHED ITSELF AS A PREFERRED APPROACH AGAINST THESE ALIEN PLANTS. BIOLOGICAL CONTROL IS A LOW-COST, LONG-TERM AND SUSTAINABLE WAY TO CONTROL INVASIVE WEEDS. IT IS ALSO POTENTIALLY MORE VALUABLE THAN OTHER METHODS AS IT HAS LESS ENVIRONMENTAL IMPACT AND TARGETS THE PEST SPECIFICALLY AND THUS EFFECTIVELY.

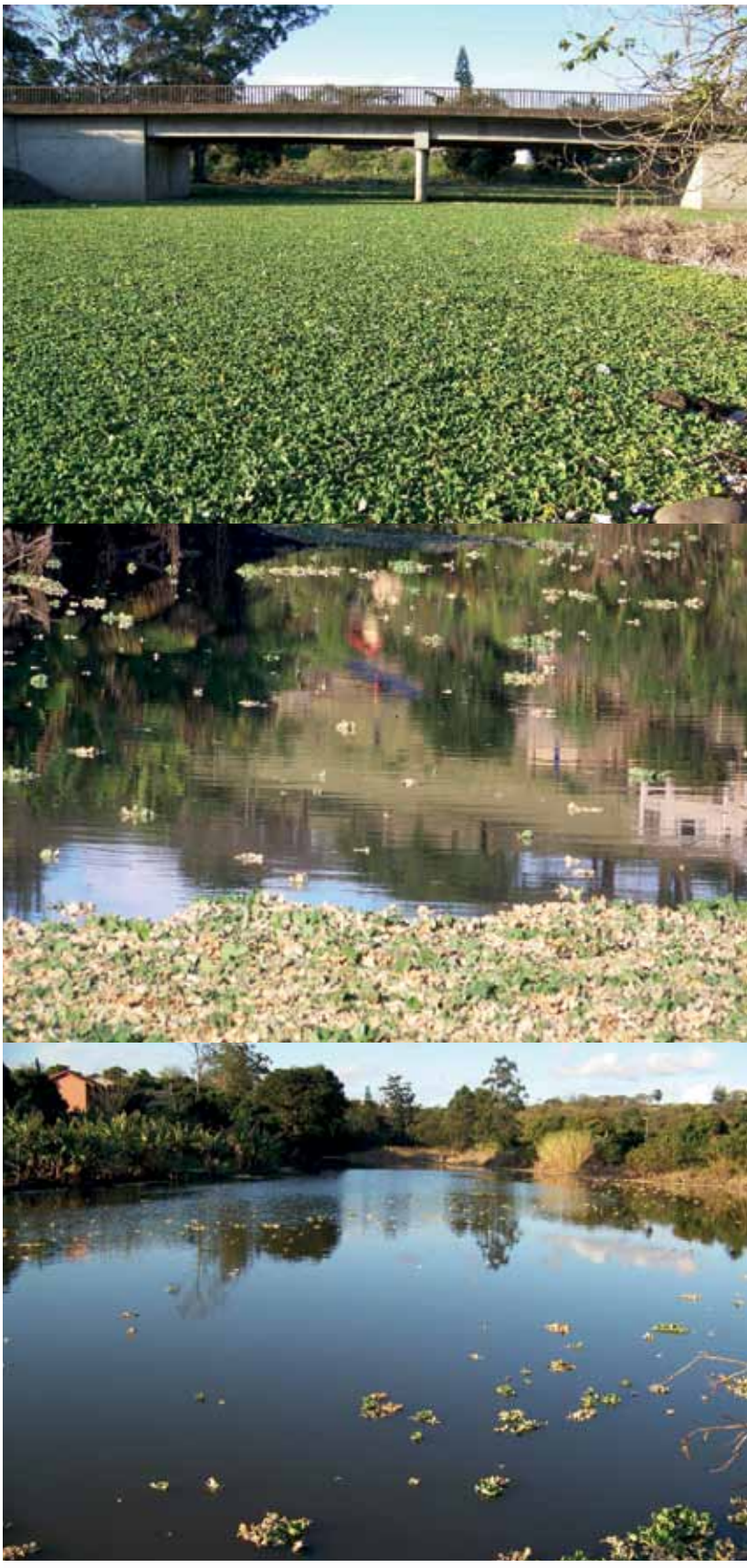
Through advanced insect rearing facilities and skills, SASRI has become a significant partner in several weed biocontrol programmes managed by the Department of Water Affairs (DWA) through their Working for Water (WfW) programme.

In the Klaserie area, a dam serving citrus, mango and wildlife estates covered completely by Kariba weed (*Salvinia molesta*) was cleared of this weed within a year after the release of 9 750 species specific weevils (*Cyrtobagus salviniae*). Further consignments have been sent to the Mpumalanga, Limpopo, KwaZulu-Natal, Eastern and Western Cape provinces, where similar weed control successes have been recorded.

Kruger Park has received two other weevils species, *Neohydronomus affinis* for water lettuce control at Orpen dam, the Sabie river and at seepages close to Skukuza, and *Neochetina bruchi* for water hyacinth control on the Letaba River, at Engelhard dam, and Makhadzi Spruit. Since biocontrol started at the latter sites three years ago, herbicide sprays have not been necessary.

Wewe Dam at Tongaat was SASRI's first successful venture into aquatic IAP biocontrol. Tongaat Hulett was spending large amounts of money on annual herbicide programmes to control water weeds on the dam. The release of 8 700 *Neohydronomus affinis* on the dam cleared the surface of water lettuce in six weeks. However, within another two months water hyacinth took the place of the water lettuce. *Neochetina bruchi*, and a sap sucking insect (*Eccritotarsus catarinensis*) cleared this infestation within a year. But again, the clear water was quickly replaced by an explosion of water lettuce, which was again controlled with its specific biocontrol agent. Our experiences at Wewe dam showed that the control of IAPs is not a quick operation. The seeds of these water weeds in particular remain viable for up to nine years in the mudbeds, and as soon as enough light reaches them, they germinate.

Towards the end of 2011, we started supplying biocontrol agents for the water lettuce and water hyacinth infestations along the uMngeni River, which over the



Top: *water lettuce totally covers the river's surface.*
Middle and below: *reduction of water lettuce.*

Wewe Dam at Tongaat

past few years have caused great concern for the organisers of the popular Duzi Canoe Marathon. Since then, they have already had an impact, as reported in a number of newspaper and magazine articles in the build-up to the race. These releases will continue on the water system for the next year at least, in a planned way. In time to come, the Msunduzi and uMngeni river systems should not need herbicide applications.

While these examples point to success in increasing water supply nationally, biological weed control programmes have significance for agriculture. The sugar industry has adopted an integrated pest management (IPM) approach to controlling pests. Biological control is a key element of this approach. Weed biocontrol reintroduces the diversity that existed prior to the introduction of sugarcane in South Africa.

For example, eldana previously lived in wetland sedges where its population was controlled by a complex of natural enemies. Unfortunately, these wetland habitats were encroached by sugarcane fields, and more recently alien invader plants which have drastically reduced the density of eldana's host plants and natural enemies. By biologically controlling alien plants and re-establishing indigenous host plants, eldana will be attracted back into their natural habitat (which it prefers to sugarcane).

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