



# SILVERLEAF BITTER APPLE CAUSES CONCERN

by HILDEGARD DE BEER  
Plant Protection Research Institute

The silverleaf bitter apple, *Solanum elaeagnifolium* Cav., family Solanaceae, is a perennial, shrubby or ligneous weed that causes serious concern because of its rapid spread and the plant's ability to invade crops and pastures.

It seems to be virtually impossible to eradicate the weed mechanically or by means of herbicides, since the deep, spreading root system is not destroyed by these methods, but is stimulated to form shoots resulting in dense colonies of new young plants around the mother plant. Silverleaf bitter apple is also commonly known as bitterleaf nightshade. The common Afrikaans name is "satansbos", although it is sometimes called "bitterappel". Elsewhere in the world it is also known as whitehorse nettle, bull nettle, tomato weed and trompillo.

## MORPHOLOGY

Silverleaf bitter apple is a many-branched, erect shrublet, usually 300 to 600 mm tall, with roots and rhizomes that can occur to a depth of 2 m. The stems and leaves are covered with fine, white, felt-like hairs which give the plant its typical silvery appearance. On the stems and leaves, particularly underneath the main vein, there are usually fine, straight, reddish prickles. These may sometimes be absent. The linear to oblong leaves which sometimes have undulate edges, are greyish-green on the upper and whitish on the lower side. The leaves vary in length from 2 to 10 cm and are 2 to 2,5 cm wide.

During spring the plant produces pale mauve, blue or even white flowers near the tips of the stems. The flowers, which resemble those of the potato plant, are star-shaped with five corolla lobes and have five striking bright-yellow stamens in the centre, and reach a diameter of 3 cm.

From these flowers round, shiny, green berries with white patches develop. The berries are about 12 mm in diameter. The ripe berries are slightly shrivelled, yellow to deep yellow and contain a large number of smooth, greyish-brown, lenticular seeds.

Apparently the seeds germinate in autumn and the young plants develop an extensive root system

during the first few months. The flowering period extends over several months - from spring to summer. At the end of summer the aerial parts of the plant die, but the dead stems remain standing for a few months. The root system does not die off but sprouts again the following season.

## DISTRIBUTION

Silverleaf bitter apple is indigenous to North and South America and has spread to most temperate zones of the world. It is a serious pest in North America - California and Arizona in particular - as well as in India, Australia, Argentina and South Africa.

It is usually assumed that the weed was accidentally imported to South Africa during the forties or fifties, probably together with hay, and that it spread in the Republic in the same way. There are, however, indications that it was noticed in the vicinity of Wolmaransstad as early as 1919.

The biggest silverleaf bitter apple infestations in South Africa occur in the Kendrew area in the Eastern Cape, in the Western Transvaal and on the Springbok Flats. The weed is now also invading Natal, the Southern Cape interior and the Free State. According to a survey done in 1972, 14 500 ha had been infested by the weed; this area is now probably much bigger. At that time 91% of the infestations occurred in the Karoo and the Highveld regions.

Silverleaf bitter apple grows in areas with an annual rainfall of at least 300 mm and it is not restricted to any specific soil type. It occurs mainly on disturbed soil, neglected lands, grazing camps, along roads and in water furrows. Where the weed occurs in cultivated fields, the spreading root system causes such dense stands of the plant that in time other crops cannot be grown on such fields.



**FIG. 1 - A ploughed land infested with silverleaf bitter apple**



In grassveld the weed is usually in balance with the grass, but because animals do not find it palatable, silverleaf bitter apple will ultimately supplant the natural vegetation if the veld is overgrazed. Infestations are particularly severe around watering-places where animals trample the natural vegetation.

#### **PROPAGATION**

Silverleaf bitter apple propagates in two ways, namely by forming seeds and by means of the spreading root system which sprouts to form new plants. When the aerial parts of the plant are cut off, this stimulates the root system to sprout. Pieces of roots that break off when the soil is tilled could also be spread via the implements used.

A fully grown silverleaf bitter apple plant produces up to 200 berries per growing season and each of these can contain between 60 and 120 seeds. These seeds are spread by water, in bales of hay or lucerne, adhering to agricultural implements and vehicles, or in the dung of cattle, sheep and guinea-fowl which ingest the berries. When the aerial parts die off in winter, the ripe berries remain on the stems and can therefore also spread when wind blows the dry branches around.

**FIG. 2 - A silverleaf bitter apple plant with flowers and fruit**



**FIG. 3 - The mauve flowers which resemble those of the potato plant**

#### **OTHER TRAITS**

It has been confirmed that all parts of the plant, but the berries in particular, are toxic to animals to a certain extent. In Texas, USA, ingestion of the plants has caused mortalities. The symptoms of silverleaf bitter apple poisoning are excessive salivation, impaired breathing, bloating, shivering and diarrhea.

#### **LEGISLATION**

Silverleaf bitter apple has been proclaimed a noxious weed throughout the Republic under the Conservation of Agricultural Resources Act 1983 (Act No. 43 of 1983). In terms of this legislation no-one may spread this species or allow it to be distributed, and it must be controlled wherever it occurs.



**FIG. 4 - Mature seeds**

## **CONTROL**

No chemicals are registered for the control of silverleaf bitter apple. However, by removing the aerial parts before seeds are formed, farmers can eliminate propagation by means of seeds. Such

action would also gradually deplete root reserves if the aerial parts are constantly cut. This will debilitate the plant and prevent the roots from forming shoots.

Research is now in progress on possible biological control of the weed by means of organisms imported from the Americas.

