**SIVERLEAF NIGHTSHADE (Solanum elaegnifolium Cav) Or White Horse Nettle**

**AN INTRACTABLE WEED OF SOUTH AUSTRALIA**

Silverleaf nightshade *(Solanum elaegnifolium* Cav), sometimes called white horse nettle, is an erect, summer growing perennial with a precise purple flower.

Its first botanical name, *Solanum,* reflects its narcotic ability to 'quieten and comfort one'. Its species name, elaegnifolium, links its leaves to the likeness of the Oleander

Botanists describe this plant in those rather gracious terms, but far from being 'calming and comforting' for many landholders across southern Australia, it is a source of worry and frustration. It is indeed an intractable weed. Thick tatty files held in the South Australian Animal and Plant control Commission's office bear testimony to the hundreds of landholders who have sought relief over the past 50 years.

Clothed in native innocence, its true weedy potential was not suspected until the beginning of 1958. Mr Lex Walker, then Director of the Plant Services Division in the South Australian Department of Agriculture, had more than a decade of interest in weed control behind him. He observed on Mr William Hawker's property "Calcania", near Clare, that patches of tomato weed were different. They were spreading and seemed much more aggressive than the native plants they were thought to be. The lower leaves were much larger and had undulating margins, unlike the native tomato weed *(Solanum esuriale Lindl)* commonly called quena. This plant was occasionally found in the cereal growing areas as did some close relatives, potato bush *(Solanum ellipticum R Br)* and western nightshade *(Solanum coactliferum* J M Black). They had always seemed harmless enough despite quena and potato bush being proclaimed noxious weeds under the *Weeds Act 1956*. At Calcania something was different, Walker therefore sought the advice of Mr. David Symon, the botanist at the Waite Agricultural Research Institute.

Writing in reply on 28thMarch 1958 Symon advised that he and Dr Eichler, the State Government Botanist had examined many Solanum species held in the State Herbarium and as a result were suspicious that the weed at Clare was not a native plant but silverleaf nightshade *(S elaegnifololium).* Plants, collected in the suburbs of Adelaide 40 years previously had been identified as this species, but they did not have enough type specimens to be sure.

In his reply to Walker, Symon stated, 'I feel confident that *Solanum elaeguifolium* should be proclaimed a noxious weed even to the exclusion of *Solanum esuriale* but until they can be separated readily I suppose they will have to remain in combined disfavor'. Three months later the Kew Herbarium near London confirmed the silverleaf nightshade subterfuge. There was no doubt that under the guise of the native tomato plants, it had been allowed to become well established across South Australia.

One of the first tasks of the then newly appointed Weeds Adviser, Arthur Tideman, was to assess the extent of the infiltration of silverleaf nightshade into South Australia from its native home in central and south-western North America. So called tomato weed infestations were carefully examined wherever recorded. There was no doubt silverleaf nightshade was by then widely established across the State causing losses to cereal crops at Cleve on Eyre Peninsula and across the northern cereal at Clare, Hilltown, Owen and Rhynie and at Keith and Lameroo.

After carefully discussing the effects of these infestations with land holders, Tideman warned that paddocks with scattered infestations on sandy soils could suffer at least 30% yield losses in wheat and barley.

After searching the literature Tideman was able to report that while silverleaf nightshade had long been a problem in Texas ( its native home), where over one million acres were infested, it was only recently that it was becoming a weedy species in Victoria and New South Wales and as far away as South Africa ( first observed 1952) and Morocco.

Tideman's report, backed by further details supplied by Symon, convinced the Weeds Advisory Committee to proclaim *Solanum elaeagnifolium* a noxious weed in July, 1959. At the same time the native species *Solanum ellipticum and Solanum esuriale* were proclaimed innocent and removed from the regulations under the *Weed Act 1956*.

3

Research to control silverleaf nightshade in South Australia was first carried out by Max Ross at a number of sites during 1960. One of the most extensive and interesting was at Meningie where various patterns and depths of ripping were tested. Ninety percent reductions in the above ground shoots were recorded in the first season after ripping to about 30cm deep. After three or four years the colonies were back to their original densities unless continuous spot spraying with long life non selective herbicides such as dalapon were used. Ross also found that the butoxy-ethanol ester of 2,4-D could be used to prevent seeding. Vigorous lucerne stands were also found to check the weed but in practical and economic terms silverleaf nightshade control proved very difficult.

In 1964 the first in depth survey of the distribution and importance of silverleaf nightshade was conducted by Ms Jacqueline Burford, who was employed as a research officer in the Department of Agriculture. Her findings were very thorough and alarming. She found 34 sites of silverleaf nightshade, which in total covered 3000 ha. Twenty-three of these sites were on cropped farms. She recorded a well established area of approximately 350 acres in 11 inch rainfall Mallee country four miles south east of Loxton. Also an area at Bordertown with an 18 inch rainfall where it was growing on grey-brown soils of heavy texture showing crabhole formation and an infestation in 15 inch rainfall country at Cleve. In addition, she recorded an infestation on an irrigated vineyard at Berri. The weed certainly had adapted to a wide range of soil types and environments throughout South Australia. She found farmers were very concerned and felt they had no means of control.

Burford surveyed native Solanum species at the same time and found that, by comparison, they generally existed as single plants and not in colonies and could be found readily in pastoral areas, whereas the silverleaf nightshade was only prevalent in agricultural areas. There was no doubt that the decision to reinstate them as insignificant native species and remove them from the noxious weeds list was correct.

4

In 1974, Mr Malcolm Catt, a Department of Agriculture Research Officer, assessed the effect of silverleaf nightshade on farms around Cleve and Mangalo on upper Eyre Peninsula where the weed was reported to have been known for 60 years. Two workshops were held in these districts which involved the current owners (Messrs G. Sprigg, W Crosby. and W Syverstsen) of properties with the oldest stands and those who were new to the struggle. The workshops were revealing. Those on the heavy soils said it was an untidy weed and they could live with it. On sandy soils the farmers had a very different impression. It reduced their crop yields and spread more quickly. They were trying to live with it by not fallowing, heavy grazing with sheep in the late summer and by spraying outlying plants with picloram. Their results were not very encouraging.

Researchers and landholders alike across South Australia were now thoroughly alarmed. Silverleaf nightshade had continued to spread unabated since it has been seriously tackled 15 years ago and no sure control measures had been found. It was time more should be done.

At the 10th Australian Weeds Committee meeting in September 1974 a group of scientists was formed to plan and coordinate research in Australia. The work was continued for six years and drew considerable research funding from the Wheat Industry Research Council. More than 100 man hours of work were funded, but all to no avail. Knowledge about the biology of the weed was improved and its susceptibility to all the known herbicides established. But that was of little practical significance.

In 1976, there was a flutter of hope when promising reports from Dr Orr, a nematologist working in Texas for the United States Department of Agriculture, reported biological control of silverleaf nightshade by a nematode, which he named *Nothanguina philobia*.It was later renamed *Orrina philobia* (Thorne) Brzesky. He observed a 65% kill of silverleaf nightshade in some areas. Previous upsurges of this nematode activity occurred in 1920 and 1930. This 1976 report proved to be another cycle promoted by very favorable conditions. At first these reports were followed with great expectations in South Australia, but no biological control occurred either here or in America.

Examination of reports filed during the 1970s and 1980s from the district weed control boards across South Australia revealed relentless efforts to restrict the spread of this weed, by then often referred to as SLN.

During these two decades, infestations were continuously monitored with the discouraging realization that the control and checking of old infestations must continue for at least 20 years, an almost impossible discipline to expect from any landowner.

At the beginning of this period of monitoring in the early 1970s, twenty two small satellite infestations on Eyre Peninsula were known beside the main infestations in the District Council areas of Cleve and Franklin Harbour. Twenty years later, despite the community efforts by the boards and landholders, these pressure points had increased to 60. But it was not all doom and gloom, twenty four isolated infestations had been eradicated in that time and the rate of spread had been reduced.

Armed with this knowledge and a summary of all the research work carried out in South Australia over 35 years, Richard Carter, a Senior Adviser, in the Animal and Plant Control Commission attended a National workshop at Wagga Wagga Agricultural Research Centre in New South Wales in September 1992. His report of the findings of the workshop stated that further mileage could possibly be gained from the application of 2,4-D the herbicide originally recommended for control and the use of glyphosate, a relatively new herbicide There was little more to report other than to carry out more of the same tedious control and extension programs.

Almost in desperation John Heap, Senior Weed Research Officer in the Weed Science Unit at the Northfield laboratories of the Department of Agriculture, while on study leave in America in the same year, visited Oklahoma and Texas to study silverleaf nightshade. In these states it is a serious problem in cotton, vegetables, peanuts, wheat and other crops. He reported that as in South Australia the current program relied heavily on the herbicide glyphosate and that really we had nothing to learn particularly because of the summer rainfall influence in these American States, and the different cropping patterns.

At the time of writing, silverleaf nightshade remains defiant.

### In 2010 PIRSA published a [Draft management plan for Silverleaf nightshade in South Australia](https://www.google.com.au/url?sa=t&rct=j&q=&esrc=s&source=web&cd=7&cad=rja&uact=8&ved=0ahUKEwilhe2onPfYAhUDGJQKHXH-BUgQFghPMAY&url=http%3A%2F%2Fpir.sa.gov.au%2F__data%2Fassets%2Fpdf_file%2F0008%2F237338%2FA809083_-_State_Silverleaf_Nightshade_Management_Plan_Attach.pdf&usg=AOvVaw3De7DpnL35ESEZddSI5A6R). This can be accessed at:

<http://pir.sa.gov.au/__data/assets/pdf_file/0008/237338/A809083_-_State_Silverleaf_Nightshade_Management_Plan_Attach.pdf>

Written by AF Tideman in 1992.

Lodged in the History of Agriculture website in February 2018.