A SWEET END TO WEEDS

by Margrit Beemster

Sugar has the potential to control annual weeds according to recent research trials conducted by researchers from Charles Sturt University. The researchers, ecologists Dr Suzanne Prober, Dr Ian Lunt and Dr Kevin Thiele, have applied sugar to trial plots for a project funded by the NSW Environmental Trust on how to restore understorey species in endangered Grassy White Box Woodlands.

Drs Suzanne Prober and Ian Lunt in the trials near Young

Trials on a private property “Windermere”, and a travelling stock reserve “Green Gully” near Young in central NSW have provided dramatic results, with Paterson’s Curse and Wild Oats flourishing in untreated plots whilst plots treated with sugar had far fewer annual weeds.

Non-chemical alternative

The researchers have found that sugar provides a good, short-term non-chemical and ecologically friendly method of weed control. “It appears sugar is a tool we can use to help change a system back to one dominated by native species rather than weeds,” says Dr Suzanne Prober who has been working to conserve and restore grassy white box woodlands for the past 15 years. Nearly all of the woodland belt, from southern Queensland to north-east Victoria is now used for agricultural purposes, principally wheat and sheep.

So why does the sugar work? Because it is one of the fastest ways of reducing soil nitrate levels. Dr Prober compared soil nutrients in undisturbed woodlands and disturbed, degraded sites. She found the most striking difference between the two was in nitrate levels, which were extremely low in undisturbed remnants and high in degraded remnants.

“It seems that many of our weed problems are due to high nutrient levels”, says Dr Prober. “There is an enormous amount of information on how to increase soil nitrogen to improve crop growth, but very little on doing the reverse. However there has been some research done overseas where sugar was used to tie up nitrogen levels for a short time.”

Sugar Trials

The researchers, who spread half a kilogram of refined white sugar to each square metre of soil every three months, found this inhibited weed growth of most annual weeds giving the native plants the opportunity to become well-established. However more research is required to work out the optimum rate of application. “We realise that the sugar levels we used in our trials would not be economic to use over broad scales”, said Dr Prober, “but at the moment we don’t know if we would get similar results if we used less sugar or if we used cheaper alternatives such as molasses or sawdust”.

So how does sugar reduce soil nutrients? “When sugar is spread on the soil, it feeds soil micro-organisms, which then absorb lots of soil nutrients as they grow,” explains Dr Ian Lunt from CSU’s Institute for Land, Water and Society. “The micro-organisms then hold these nutrients so the weeds can’t gobble them up. In effect we are ‘starving’ the weed species that require lots of nutrients to grow. “The lack of nutrients stopped the weeds from growing large, allowing the native plants, which can grow well in low nutrient levels, to grow bigger and faster.

The trial plots are now in their fourth year and the researchers believe that as the native grasses they have sown grow large enough, they will be able to lock-up the nutrients in their roots which will keep the weeds in check in the long run. Early results have indicated that nitrate levels are starting to drop in the plots with well established kangaroo grass.

Part of the Picture

“We see what we have done so far as only part of the picture,” says Dr Prober. “There are a number of directions we would like to go. One of our Honours students, Lisa Smallbone, is looking at whether sugar helps us to re-introduce native wildflowers into degraded sites. If the wildflowers establish well, we want to find out if they contribute to weed control and soil nitrogen cycling later on. Our long term goal is to get the native diversity back into the understorey by working out the best method to re-establish a native ecosystem that is self-sustaining and resistant to invasion by weed species.”

Using sugar as an organic weed control, to help to restore endangered woodlands and native grasslands, is an innovative alternative to using herbicides. “Herbicides are difficult to use in many remnants because they kill the native plants you are trying to save as well as the weeds,” says Dr Lunt. “Sugar does not have this undesirable effect. Herbicides also don’t reduce the soil nitrate as sugar does, which is the underlying reason for the flourishing weeds – they control the symptoms, not the cause. Sugar may also be a useful way to control weeds that grow near other endangered native plants.”

While the researchers are primarily interested in using sugar as a tool to help restore the understorey species in grassy box woodlands, they are aware their research could be the basis for other more agriculturally driven research. “Broad leaf weeds such as Paterson’s Curse are the bane of every farmer’s life. Once infestations get very bad, it gets very difficult to control them,” said Dr Lunt. “Sugar may help land managers to control broad-lead weeds and to re-introduce perennial grasses in many places across the region. In particular, it could be a really helpful tool in organic farming or in places where herbicides are difficult to apply.”

Control plot, which has had no burning or sugar treatments, showing a dominance of weeds and very poor establishment of Kangaroo Grass.

Where weeds were controlled with applications of sugar, there has been good establishment of Kangaroo Grass

Contacts: Dr Suzanne Prober Suzanne.prober@bigpond.com

Dr Ian Lunt ilunt@csu.edu.au