

Information about physical, chemical and biological control of *Ulex europaeus*

Physical: Physical control includes removing plants by hand, with machinery, or by burning (IPM, 2000). It has been found that when the plants are big, cutting at the base (at flowering time) and fraying the stump causes the stump to lose moisture and generally kills the plant, (Polster, David. pers.comm. 22 February 2002. There is a tool developed in the US specifically for pulling *Ulex europaeus*, *Cytisus scoparius*, and other woody plants. It is called a "Weed Wrench." It consists of a jack that grips the stem at the bottom of a long lever. it allows a person to gain a great mechanical advantage, (Erickson, Steve. pers.comm. 21 February 2002).

There is debate about the effectiveness of fire in controlling gorse as researchers in New Zealand have seen native species invading and outcompeting gorse on unmanipulated lands (Ivens 1979b, in Hoshovsky, 1989). As with many scrub weeds, gorse soon regrows from dormant buds on stumps if shrubs are cut with chain saws or slashers without prior herbicide treatment. Regrowth from buds can also occur after fires. (Hill *et al.*, 2000). The cheapest treatment for large blocks of gorse may be to fence it off and wait for it to revert to native bush. On less steep land, ploughing or repeated rotary slashing can be used (Ag Research, 1999).

Chemical: Many herbicides are not very effective on gorse because of the shape of the "leaves" and the thick cuticles on the spines which help prevent absorption of herbicides. However, chemical control of gorse has been well researched in New Zealand. All young seedlings were killed by picloram (Ivens 1979b, in Hoshovsky, 1989). Good results were obtained with Tordon applied during the spring and summer months. Larger plants seem to need re-treatment, and burned stumps showed a high degree of recovery and regrowth (Ivens 1979b, in Hoshovsky, 1989).

Large, isolated gorse bushes can be killed by cutting and spraying the stumps with Grazon, Tordon or Escort. A motorised knapsack sprayer uses little herbicide and kills small, scattered gorse bushes. Herbicides registered for use on gorse are: activated amitrole, Answer, Escort, glyphosate, Grazon, Reglone, Tordon, Brushkiller, Touchdown, Trounce Gorsekiller and Versatill. Most of these kill clovers and have long-term residual activity, and some kill grasses and clovers (AgResearch, 1999). An Integrated Vegetation Management (IVM) programme considers herbicides to be a transitional tool, enabling managers to suppress the weed and replace it with desirable, competitive vegetation. It is important therefore to select the least-toxic, low-residual herbicide which is effective. Herbicide should be applied to gorse when it is most susceptible – periods of active growth prior to or after flowering (early summer, early autumn, mid-winter) (IPM, 2000).

Biological: Goats will graze gorse and can kill it, but need to be properly fenced into gorse blocks and well looked after (AgResearch, 1998, 1999).

Apion ulicis, a seed weevil, reputed to destroy up to 90 percent of spring seed, was introduced to New Zealand in 1931 as a control, but has not been effective in controlling the gorse, in either New Zealand or the USA. Fast-growing tree species can shade out gorse, reducing or sometimes eradicating an infestation. Ivens 1979b, in Hoshovsky, 1989). A number of other biological control agents have been introduced to New Zealand, Hawai'i, Australia and the USA (eg. Gorse spider mite *Tetranychus lintearius*, gorse thrips *Sericothrips staphylinus*, the gorse soft shoot moth *Agonopterix ulicetella* and the gorse pod moth *Cydia succedana*), but their effectiveness has not yet been determined.

The success of a biological control programme for gorse was found to depend critically on the frequency and intensity of disturbance, whether disturbed sites became suitable for recruitment, and the effects of disturbance on germination and seed mortality (Rees and Hill, 2001).