

1. Non Technical Summary

a) Survey of weeds in cotton

A survey form asking the cost of weed control, the major weed problems and the herbicides used was sent to fifty two cotton growers from the seven major cotton areas of New South Wales. On average, weed control costs the cotton grower \$187/ha annually. The major components of this cost are \$76/ha for herbicides in cotton and \$67/ha for hand chipping. The most important cotton weeds are noogoora burr, bathurst burr, nutgrass, Chinese lantern and peach vine. Although these weeds are problems on a large proportion of the cotton growing area, repeated use of herbicides, cultivation and chipping are reducing their importance. However, nutgrass, which is a major weed problem on 15% of the cotton area, is escaping the weed management practices currently used and is rapidly spreading in many fields. Brown beetle grass is an important weed on irrigation channels and is not controlled by the registered herbicides. Trifluralin, diuron and fluometuron herbicides are used in cotton by over 60% of cotton growers. Glyphosate is used by 59% of growers in fallows before cotton, and atrazine, diuron and glyphosate are used by over 60% of growers to control weeds on irrigation channels.

Generally cotton growers are dissatisfied with the high cost of weed control, and the ineffectiveness of control of problem weeds such as nutgrass. Growers recommended that research into nutgrass control should be given top priority.

b) Field Experiments

Aspects of nutgrass ecology and management have been examined. The principle nutgrass problem in cotton was identified as *Cyperus rotundus*, with *C. bifax* as a secondary problem.

C. rotundus reproduces asexually by underground nuts and in irrigated cotton,

nuts can multiply at least 10-fold over the summer period. This rate can be reduced 80% by a directed application of glyphosate during the cotton crop, but was not altered by an application of MSMA (a commonly used herbicide). *C. bifax* has a much lower reproductive capacity, producing less than 2 nuts over summer, and the production of nuts was reduced 90% by glyphosate and 60% by MSMA, when used as directed applications in the cotton crop.

Although nutgrass (*C. rotundus*) competes strongly with cotton, it appears that cotton competes poorly with nutgrass, which was able to grow equally well in the cotton row or in the furrow. There was a strong relationship between cotton yield and nutgrass density, with high densities of nutgrass reducing cotton yield by up to 90%.

Similarly, noogoora burr competes strongly with cotton, and it was found that a single burr in 10 m of cotton could cause a 6% cotton yield reduction.

Caustic weed is a pest which is less obvious but nearly always present at high densities in cotton, although it is rarely controlled. It was found that even at high densities caustic weed causes little or no yield loss in cotton, and is easily controlled by some of the commonly used cotton herbicides.

A study on MSMA herbicide found that this chemical caused a reduction in cotton yield of up to 18% when used in the recommended manner. Also, the reduction in cotton yield was not altered by the time of day when the MSMA was applied, although applications during the warmer period (December) caused a much greater yield reduction than applications in November.

A preliminary look at the pre-emergent cotton herbicides found that none of them gave good weed control, and that regardless of any 'root pruning' effects, there was no difference between them in their effect on cotton yield.