AQUATIC WEED CONTROL IN IRRIGATION CHANNELS

A.C. Arvier
IZIANZ Ltd.

Irrigation water supplied from Lake Moogerah to farms in the Fassifern district of South Queensland travels in channels rarely more than six feet (15.24 cm) deep, and the flow of water is usually slow, seldom exceeding 20 cusecs. As a result, through the warmer weather especially, aquatic weeds and algae flourish, and the supply of water for irrigation purposes can be seriously retarded.

The plants causing most concern have been sampled from various localities, and the more frequently occurring species are listed as under:

Submersed Weeds

Potamogeton crispus
Potamogeton perfoliatus
Myriophyllum verrucosum
Hydrilla verticillata
Ceratophyllum demersum
Najas graminea

Species with Floating Leaves

Nymphaea gigantea
Ludwigia peploides spp. *montevidensis*

Shoreline Plants

Paspalum distichum
Polygonum attenuatum
Typha angustifolia

Various methods of controlling aquatic weeds were investigated by the Irrigation and Water Supply Commission of Queensland, and the injection of suitable chemicals was most favoured. The bipyridyl herbicide paraquat was subjected to closest study, as it appeared to satisfy the most important considerations viz.

(a) it has a good record of efficiency in overseas investigations and commercial application

(b) it is promptly inactivated by clay, hence irrigation water from earth channels could be safely used within a few days after treatment

(c) it is formulated as a liquid concentrate and so is suitable for 'trickle' delivery through calibrated equipment

(d) it is much less toxic than acrolein to fish and other aquatic life.

After several exploratory attempts over the 1967/68 and 1968/69 summers at metering small quantities of chemical, and endeavouring to follow the flow path of water dyed red with 'Coomassie' Scarlet, a technique was finally established early in 1969, using simple apparatus constructed by the I.W.S.C. Field Officer at Lake Moogerah. The chemical stock solution was contained in an open 12 gallon drum, which fed into a one gallon tin equipped with a float valve for maintaining a constant level. This apparatus was initially mounted at the southern end of Kent's Lagoon where gates controlled the flow of water into irrigation channel beyond. A length of flexible tubing (with a breather hole near the intake to prevent variations in flow rate) led from the smaller reservoir into the water channel.

The facilities available did not enable this exercise to be planned or conducted as a properly designed scientific experiment. New Zealand recommendations suggesting a 'contact time' for paraquat from 30-60 minutes were initially accepted for guidance, but it soon became obvious that flow rates in the channels had to be restricted to allow a longer period for the low dose levels of the chemical to be absorbed by submerged weed growth. Water flow in the channels was reduced finally to 2 cusecs, and a stock solution of 'Gramoxone' (20% paraquat ion) diluted 1 in 4 (giving 5% paraquat) was carefully drip-fed into the slowly flowing water. By adjusting this delivery to 1 pint/4 minutes, equivalent to 1 gallon 6½ pints of stock solution per hour, an initial concentration of 2 p.p.m. of paraquat ion was maintained in the water in the channels for a period of 4 hours. This chemical level undoubtedly fell as the water moved downstream, due to dilution as well as removal by the dense aquatic growth and the soil bottoms of the channels.

While the picture of susceptibility of some aquatic species to the herbicidal action of paraquat is still incomplete, the

observed results from these exercises suggest that this 'trickle' technique is a practical proposition, and worth developing in similar environments. Established infestations of *Hydrilla*, *Najas*, *Myriophyllu*, and *Ceratophyllum* were all controlled fairly quickly by the p.p.m. dose, with less effective results in the two species of *Potamogeton*. These responses took between a week and a fortnight to become obvious, and were better demonstrated from ¼ to ½ mile downstream than near the point of treatment - indeed it was only after the apparent failure of one of the earliest trials that the I.W.S.C. Field Officer took the trouble to check the channels from half to one mile downstream, and there to find satisfactory results!

Encouraged by these observations, plans are now in hand for examining variations in dose levels of chemical, as well as including diquat as a blend with paraquat, hopefully to widen the scope of weeds that can be controlled by this novel and convenient technique.

CONTROL OF WATER COUCH (*PASPALUM PASPALOIDES*) WITH AMITROLE AND AMMONIUM THIOCYANATE

J.A. Ritchie
Geigy (Aust.) Pty. Ltd.
Present address
Agriculture Protection Board of Western Australia

G.R. Sainty
Water Conservation and Irrigation Commission, New South Wales

An investigation of rates of application, timing and split application techniques.

A series of trials in the 1967/68 and 1968/69 growing seasons were designed to investigate the split application technique of controlled Water Couch (*Paspalum paspaloides*) with the formulated product of amitrole and ammonium thiocyanate.

Water Couch *Paspalum paspaloides* (Michx) Scribn (*P. distichum* Auctt. Non L.) is an emergent aquatic plant infesting drainage systems and small supply channels in the Murrumbidgee Irrigation Area. The main growth period of water couch is from November to March and it spreads by a vigorous root system and long surface runners from the margins of channels into water up to 3 feet in depth, causing obstruction and siltation of the channels. The