

## Development of plant growth regulators - mefluidide..... a review

R. Jobling  
Tape and Allied Products Division  
3M Australia Pty. Ltd.  
P.O. Box 144, St. Mary's 2760, New South Wales

## SUMMARY

Experimental work in Australia has indicated that mefluidide correctly applied has potential as a grass growth retardant and seed head suppressant in turf management in the temperate Mediterranean climates of southern Australia. Registration for these purposes has been granted in the U.S.A. When applied at the appropriate time, late winter - early spring, mefluidide may obviate mowing for 6 to 12 weeks following application depending on growing conditions. Chemical costs per hectare should approximate to the cost of one mowing, and therefore highway engineers, park and golf course curators could be interested in this chemical tool for their turf management program. Environmentally growth-inhibited grass swards may be preferable to total vegetation removal in several situations.

Growth regulation in vegetation management has many practical applications and advantages. In reviewing Australian and overseas development work, mefluidide, as a growth regulator, fits into the following pattern of use -

- Grass growth retardation of turf and in industrial situations. In practical terms the use of mefluidide partly or wholly replaces the mower in vegetation management.
- Seed head suppression accompanied by growth retardation. This characteristic has been reported for a range of grass species i.e. *Lolium* spp., *Bromus* spp. and is of particular interest with Johnson grass (*Sorghum halepense*) (Bushong et al, 1976).
- Sugar cane ripening agent for enhancing sucrose levels. The need for enhancing and maintaining sugar levels in standing cane is most apparent during unfavourable ripening conditions in the cane growing areas of Queensland.
- Tree and ornamental suppression. This action involves using growth inhibition as a means of substituting pruning.

Mefluidide was discovered in the laboratories of the 3M Company as part of an extensive research program directed to the group of chemicals included in the N-aryl,1,1,1-trifluoromethane sulphonamides, a new class of herbicides and plant growth regulators.

A soluble liquid concentrate (240 g a.i./ℓ) has been formulated and used as the basis of development work in Australia and has now

reached the marketing stage in some overseas countries.

In studying the mode of action, experimental work has shown that the compound is mainly absorbed through the foliage. Experiments with radio active labelled compound confirm the foliar uptake of the chemical, although some limited root uptake was also observed.

Truelove *et al* (1976) report that, at appropriate concentrations, growth is inhibited causing stunting of treated corn and some chlorosis can be expected on those leaves which expand after treatment. Emergence of green leaves follows. Chlorophyll is not affected on leaves actually sprayed. Mode of action at the cell level is not clear.

Labelled compound, when applied to the basal leaf sheath and leaf axil, appears to penetrate readily and is translocated within the plant. However, when applied to the roots and midleaf, relatively little of the radio active compound is translocated to other parts of the plant.

In reviewing the efficacy data (Anonymous, n.d.; Anonymous, 1975) as presented by trial results from Australian and overseas work, particularly in its application to grass retardation, the following facts have emerged '-

- \* Mefluidide is active as an acceptable growth regulator on such grasses as *Lolium* spp., *Bromus* spp., *Holcus lanatus* and similar species characteristic of the temperate autumn - winter-spring growing season.
- \* Retardation varies according to the timing of application, vigour of the sward and growing conditions at the time. Periods from 6 to 12 weeks are reported before the sward requires mowing.
- \* It is essential that the sward is vigorously growing to provide enough healthy foliage for uptake. Consequently, two programs have been suggested for best practical results viz, premowing 3 to 4 days before application or post mowing 3 to 7 days after application. In many situations the later program gave the longest period of grass suppression.
- \* Seed head suppression is a characteristic reaction of all susceptible species, and is particularly notable in Johnson grass.
- \* Application rates must be adjusted according to the situations, but range between 480 gm a.i. to 720 g a.i. per ha. Good coverage is essential, with boom spray application a minimum of 300 l/ha is recommended.
- \* Perennial summer growing grasses such as *Paspalum* spp. and kikuyu do not respond to control programs under Australian conditions and further research is in progress on these grasses.

Growth regulation as an aid to vegetation management requires a

different set of criteria for performance and acceptability to conventional herbicides and these have been taken into account in the development program of mefluidide.

## REFERENCES

- Bushong, J.W., Gates, D.W. and Sullivan, T.P. (1976).- Mefluidide (MBR 12322) - a new concept in weed control with a plant growth regulator. *Proceedings Brit. Crop Prot. Conf. - Weeds*, Vol. 2, p 695-98.
- Truelove, B., Davis, D.E. and Pillai, C.G.P. (1976).- Mefluidide - effect on growth of corn. *Weed Sci.* 25 : 360-363.
- Anonymous (n.d.).- MBR 12325 4-S Plant Growth Regulator. Condensed Experimental Permit application for turf submitted by U.S. E.P.A. by 3M Company (unpublished).
- Anonymous (1975).- Agrisearch Services Pty.Ltd. Evaluation of MBR 12325 as a growth retardant - winter/spring growing species. 1974 Orange, Australia Trial. Report No. 8/750/420 (unpublished).

