J. Aquat. Plant Manage. 21: 36-37 (Notes)

NOTES

Laboratory Trials of Fluridone on Sago Pondweed[1]

JORGE H. IRIGOYEN
AND ROBERTO E. BREVEDAN

Laboratory of Plant Physiology and Ecology,
Universidad Nacional del Sur,
8000, Bahía Blanca, Argentina

INTRODUCTION

The irrigation districts of Southern Argentina have an extensive canal system and much of it is infested with sago pondweed (*Potamogeton pectinatus L.*). Approximately 300,000 ha of the Colorado River Lower Valley and the Río Negro Lower Valley are under irrigation.

Sago pondweed growing in irrigation canals restrict their flow, increase silting and loss of water through evaporation.

Weed growth in drainage canals interferes with normal drainage and consequently increases salinity processes in cultivated areas.

Fluridone (1-Methyl-3-phenyl-5-3 (trifluoromethyl) phenyl-4 (1H) pyridinone) is an experimental herbicide currently being developed by Elanco Products Company. It was effective on a large number of vascular aquatic plants (1, 5) and its characteristics and mode of action (2) denotes that is a promissory aquatic herbicide.

The aim of this work was to evaluate its herbicidal potential on sago pondweed under continuous contact and in limited contact tests. Appraisal with limited contact tests allow evaluation of herbicidal performance for use in mobile waters, such as drainage canals and minor water courses, where a short period of exposition is essential to control the weeds (3). On the other hand, continuous contact permits the evaluation of its herbicidal potential in static waters such as lakes, ponds or reservoirs. Blackburn and Weldon (1962) showed that laboratory results gave reliable indications of the the success of large scale applications.

MATERIALS AND METHODS

Tubers of sago pondweed were collected in drainage canals of the Colorado River Lower Valley (62°37'W, 39°23'S, 22 m above sea level). They were stored at 4C several months before use in the experiments.

Three tubers were sown in each plastic pot containing 200 cm^3 of soil and kept in an illuminated tank under tap water for 20 days or more. At the end of this period, two plastic pots were transferred to each ten liter glass containers used as experimental units. Plants were grown under mercury vapor lamps supplemented with incandescent lamps on a 12 hr photoperiod. Maximum daily temperatures varied between 18 and 27C and the daily minimum was kept above 15C. After 20 days, when the plants were 50 cm high and presented a well developed foliage, they were deemed ready for herbicide treatments. Treatments consisted of applications of fluridone at different concentrations for different periods of time, including continuous contact. After plants were exposed for the desired time they were removed, rinsed and placed under tap water. Three experiments were done: 12 and 24 hours contact treatments at 3, 5 and 10 ppm; 24 and 48 hours contact treatments at 4, 8 and 12 ppm and continuous treatments at 1, 2, 4, 8 and 12 ppm of fluridone. A randomized complete block design with three replications was used.

Evaluation of herbicidal activity was recorded weekly for a period of two months. Injury due to fluridone was reported on a 0 to 100% visual scale with 0% representing no effect and 100% representing total mortality of the plant. By the end of the experiments, the control plants had produced a dense foliage and a total length of 120 to 150 cm.

RESULTS AND DISCUSSION

A low percentage of control was obtained in twelve hour contact treatments without significant differences among concentrations (Fig. 1). Twenty four hour contact provided greater control and control increased with higher fluridone concentrations. Significant differences between contact times were found. This suggested that 24 hours of contact or more at 3 ppm or higher concentrations would result in effective weed control. Twenty four and forty eight hours treatments gave 58 to 75% control without having significant differences between hours. Continuous contact test results were similar to those obtained after 24 or 48 hours contact period. Although differences were not significant, there was a tendency toward a larger percentage of control with longer periods of contact. Maximum control of sago pondweed with fluridone was 75%, which was obtained with 12 ppm fluridone in contact for 24 to 48 hours or with 4 ppm under continuous contact.

First symptoms of fluridone action can be seen after the second week of treatment. The main symptom was a chlorotic epinasty of apices and regrowth from lateral buds, followed by a progressive chlorosis of the entire plant.

Defoliation started after 7 weeks, but in none of the treatments were the plants completely killed.

[1]Supported in part by Comisión de Investigaciones Científicas of the Province of Buenos Aires.

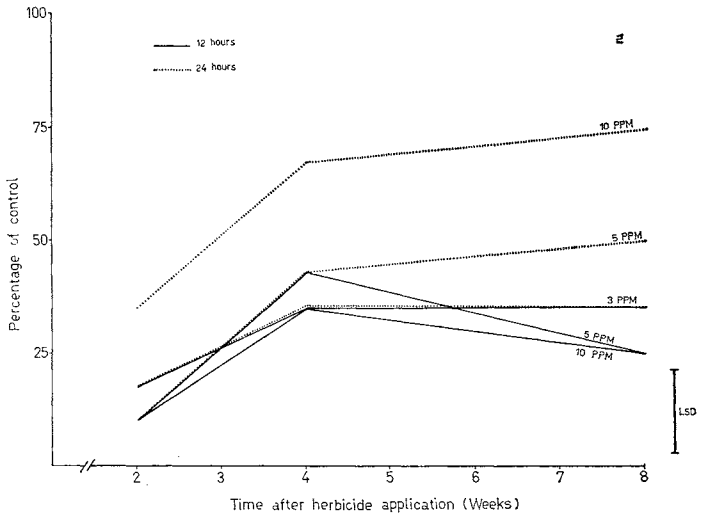

Figure 1. Percentage control of sago pondweed after exposure to various concentrations of fluridone at 12 and 24 hours. Means of three replicates are compared using LSD at the 5% significance level.

Results obtained in limited contact test of 24 hours or more and in continuous contact did not show significant differences that could indicate that fluridone exerts its action within 24 hours after being applied. Consequently it would be expected that continuous applications of fluridone in flowing waters or in formulations such as pellets, ensuring slow liberation of the active ingredient during this period, would produce the same control as the one achieved in still waters.

Results of this study showed that sago pondweed is fairly susceptible to fluridone. On the other hand, Dechoretz and Frank (1978) have shown that fluridone was generally ineffective on natural or well established plants of sago pondweed. Anderson (1980) showed that light is a requirement for phytotoxic action of fluridone in sago pondweed and American pondweed (*P. nodosus L.*).[2] Probably under field conditions where light intensity is not a limiting factor, fluridone would show more effectiveness.

LITERATURE CITED

1. Arnold, W. R. 1979. Fluridone a new aquatic herbicide. J. Aquat. Plant Manage. 17:30-33.
2. Bartels, P. and Watson, C. W. 1978. Inhibition of carotenoid synthesis by fluridone and norflurazon. Weed Science 26:198-203.
3. Blackburn, R. 1963. Evaluating herbicides against aquatic weeds. Weeds 11:21-24.
4. Blackburn, R. and Weldon, L. W. 1962. Control of southern naiad and other submersed weeds in South Florida irrigation and drainage canals. Proc. Swedish Weed Conference 15:254-255.
5. Dechoretz, N. and Frank, P. A. 1978. Evaluation of velpar, buthidazole and fluridone for the control of aquatic weeds. Proc. West Soc. Weed Sci. 31:111-116.

[2]Anderson, L. W. 1980. Personal Communication.