Integration of chemical, physical and mechanical methods in Common Reed (Phragmites australis) management

Ashour Ahmed, S.
Plant Protection Dept., Faculty of Agriculture,
Assiut University, Egypt.

Summary Dense stand of common reed (Phragmites australis (Cav.) Trin.) in a dry pond was subjected to 2 applications of dalapon at 8 kg a.e./ac. in mid-autumn, firing 10 weeks after herbicide 2nd application, ploughing and removing of dead rhizomes with ploughed soil then flooding. Less than 5% of the initial plant cover regenerated 10 months after herbicide application.

INTRODUCTION

Common reed is one of the most common aquatic weeds in Egypt. Despite the plant may provide shade, shelter and food for fish, some problems may be encountered with its invasion, e.g. high evaporation rate and difficulties in fish farming practices.

The plant can be controlled by herbicides such as dalapon (Beste et al., 1983) which can be applied in autumn after draining water from the system (Bowmer, 1987). Burning followed by rotary cultivation proved effective in reducing plant height and number of shoots and flowering stems in the regenerated plants (Kamio, 1985) and in breaking succession in the plant (Hertzman, 1986).

The objective of this work is to evaluate an integrated management system using chemical, physical and mechanical means on the dense stand of this weed.

METHODS AND MATERIALS

The area under trial was a pond of ca. 3000 m$^2$ located at Assiut University Campus. It had been used as a fish farm for long time, and it was completely free of reed infestation. The pond had to be dried 5 years ago in order to facilitate construction of a new nearby building for the planned University campus, i.e. to dry the leaching line between the pond and the place of construction. Shortly after draining the water, the invasion of reed started and extended gradually and reached more than 85% of the total area; forming a very dense community. The aerial culms of plants reached >3 m height and >2 cm diameter. The construction work nearly ended by autumn 1988. To reform the pond, it had to get rid of the infestation. The following steps were carried out:

a) The sodium salt of dalapon (2,2-dichloropropionic acid) was applied on the plants in November 8th, 1988 at 8 kg a.e./ac. using high volume spraying (400 l water/ac.). The application was repeated after 2 weeks. Dalapon was chosen due to its very low order of toxicity to fish (Beste et al., 1983) and it would also
dissipate from the sediments within few weeks (Bowmer, 1987); b) fire was set 10 weeks after herbicide 2nd application to burn the dried plants; and c) the soil was then completely ploughed up to 45 cm depth. Two weeks later, the ploughed soil with plant debris and dried fragmented rhizomes were mechanically removed. The pond was then filled with water in March 1989.

RESULTS AND DISCUSSION

The herbicidal treatments caused severe injury to reed. The plants started to turn yellow 2-3 weeks after the 1st application then dried with time. Three months elapses after starting herbicidal treatment was considered enough for complete drying of the plants. Meanwhile, burning seemed necessary to get rid of the dried plants and to facilitate ploughing and mechanical removal of the fragmented rhizomes of treated plants. The depth of 45 cm appeared satisfactory for plant rhizome removal. Extensive underground spread of rhizomes was noticed during ploughing and soil removal. Samples of fragmented rhizomes indicated that the plant rhizomes had been reached >3 cm diameter.

After filling the pond with water, observations on the reed regeneration indicated that >5% of the initial plant cover regenerated by 10 months after herbicide application.

The results obtained can be attributed to the combined effect of the measures applied, i.e. herbicidal treatments that severely affected the established stand; burning the debris; ploughing and removing of ploughed soil away with the fragmented dried rhizomes of treated plants. The layer of water after flooding the pond might add another stress on the fragmented rhizomes (Agarkov, 1980) that might be left and still survive.

References


Résumé La communauté dense de Phragmites australis (Cav.) Trin. dans une étang sec s'est assujetti à deux applications de dalapon avec 8 kg a.e./ac. en le milieu d'automne, puis, incendier après 10 semaines, labourer et elogner de rhizomes mortes avec la terre labouré, et puis l'inonder. C'est a observé que moins de 5% de plante initial ont été regeneré après de 10 moins de l'application de herbicide.