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INTEGRATED MANAGEMENT OF CATTAILS IN WATER CARRIAGE WAYS OF PAKISTAN

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ABSTRACT

Cattail, Typha angustata (= T. domingensis) is an emergent aquatic weed causing serious problems in drainage channels. Studies were carried out to manage its natural population in water drainage by integrating different control measures. Of the four treatments studied, the best one was where mowing of Typha was followed by planting paragrass (Brachiaria mutica) consequently reducing the weed population by 94.7%. Paragrass completely replaced cattail in one year time. Paraquat spray gave a good immediate control (84.2% reduction) however, regrowth from underground rhizomes created a problem. Mowing + paragrass planting is recommended for managing cattails in the water carriage ways. Further research is suggested to confirm our findings under ecological conditions of Pakistan.

Key words: *Typha* control, paraquat, paragrass, mowing

INTRODUCTION

Cattail, *Typha angustata* Chaub. & Bory (= T. *domingensis* Pers.) is an emergent aquatic weed and causes serious problems in the water carriage ways of Pakistan. It is widely distributed in water-logged areas and along irrigation/drainage channels threatening to impede the flow of water and increase evaporation. In some regions it has been reported as a pest hard to eradicate from irrigation canals and ditches (Chaudhry, 1969). Cattails are tall, upto about 2 meters, grass like plants with fleshy leaves. They spread rapidly by rhizomes and by small, airborne seeds that may remain viable for 5 years or more (Martin *et al.*, 1957; Chaudhry and Zawawi, 1983; Chaudhry,1969). Cattails are the characteristic of situations having a water table ranging from just below ground level to about half the maximum height of the plant (Woodford, 1960). Studies have shown that fire, hydrology as well as surface water nutrients are limiting factors for cattail abundance (Newman *et al.*, 1996,1998). Many different control measures have been carried out against the weed including use of chemicals as dalapon (Saghir and Chaudhry, 1985) glyphosate (Kay, 1999) atrazine and paraquat (Moore *et al.*, 1957; Hellsten *et al.*, 1999) and bio-agents as insects (Landau *et al.*, 1996), grass carp and pathogens (Wheeler and Stoops, 1998; Tsuchiya, 1979; Barreto and Evans, 1996) as well as by replacement technique (Mehta and Sharma, 1974).

While carrying out benefit/cost analysis of cattail control many researchers considered it as a useful plant. With the control of *Typha*, populations of other species such as waterfowl enhanced that was harmful for sunflower producers and upland game was reduced (Leitch *et al.*, 1997). Cattails have been used in all parts of the world as food, bedding, roofing and parts have been used to make baskets, shoes, rope and paper. Cattail ointments have been used for treatment of snakebite, measles, insanity and many other disorders (Anon, 1981). Of all wild plants, cattails have been called the

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most useful emergency food source. They are also a source of pulp, paper and fiber (Morton, 1975). However, in water drains they create immense problem and therefore the present studies were carried out to manage *Typha's* natural population in water drain by integrating different control measures.

MATERIALS AND METHODS

Site was selected at National Agricultural Research Centre, Islamabad. Healthy plants of *Typha angustata* were growing in water drain. The height of plants was 2-3 ½ ft. Some of them had heads. Four treatments and a control was replicated thrice in randomized complete block design. The treatments included weedy check, mowing + paragrass planting, paraquat (Gramoxone) spray @ 3.75 L ha^{-1}, repeated mowing thrice and Mowing + paraquat spray + planting paragrass.

Since the plants were growing on sides of the water drain, plots were accordingly made in a size 2 x 1 m^2. Paraquat spraying, first mowing and paragrass planting were done on June 10, 2000. Second mowing was done 15 days later while 3rd and 4th mowings were done one and two months later, respectively. Paragrass (*Brachiaria mutica*) was obtained from Barani Livestock Station, Fateh Jang. It is a valuable for fodder and is being used for experimental purposes at the station. Mowing of *Typha* was done by cutting the leaves of the plants. The data for the individual parameter were subjected to ANOVA technique and the means were separated by Fisher's protected LSD test (Steel and Torrie, 1980).

RESULTS AND DISCUSSION

Natural population of *Typha* showed a decrease in winter i.e. in November. However, afterwards it increased reaching to a peak in May/June. This population trend was observed in most of the treatments (Fig. 1).The data in Table-1 indicates significant differences among the treatments. The best being mowing of cattail and planting of paragrass that reduced 94.7% of *Typha* population. Paragrass being a highly competitive species got established and covered *Typha* plants cutting off solar radiation from them. *Typha* population almost vanished 5 months after planting paragrass and the grass replaced *Typha* completely in one year time. Similar results were obtained by Mehta and Sharma (1974) who stated that the grass could control *Typha* and solve the problem of unproductive land.

Paraquat spray and mowing + paraquat spray + planting paragrass, treatment also controlled *Typha* (84.2% and 78.1% reduction, respectively). However, new plants emerged from the underground rhizomes. Repeated spraying may have a better result. Some other herbicides may also be tested as Moore *et al.* (1999) stated that atrazine gave better control as compared with paraquat in an aqueous 7-d germination and growth experiments. Considering the extent of the control by repeated mowing it may be mentioned that water level decreased in the experimental area during the winter months. Though mowing was done but was not below the water level. As indicated by Martin *et al.* (1957) while testing the efficiency of a hydraulic weed cutting boat mentioned that cutting at 20 cm and 50 cm below the water surface was very effective in removing *Typha* stands. Results of Newman *et al.* (1998) showed that increased water depth and duration of flood have a significant impact on cattail expansion. Therefore, re-growths took place in the repeated mowing treatment plots and good control could not be obtained.

Thus for permanent management of *T. angustata* stands in marshy/drainage ditches, replacement by *B. mutica* is very useful. Paragrass may clear the unproductive

land and may be utilized as fodder. However, this method may not be useful in water channels where unobstructed flow of water is required all the year round.

Table-1. Effect of different treatments on *Typha angustata* population in different treatments.

S. No.	Treatments	Initial No. of plants (Av)	Final No. of plants (Av)	Reduction (%) (Av)
1.	Woedy check	36	32 a[2]	11.1 d
2.	Mowing + planting paragrass	38	2 d	94.7 a
3.	Paraquat @3.75 L ha^{-1}	38	6 c	84.2 ab
4.	Repeated mowing	38	15 b	60.5 c
5.	Mowing + paraquat + planting paragrass	32	7 c	78.1 b

[2] Means sharing a letter in common in the respective column do not differ significantly by LSD test at 5% probability level.

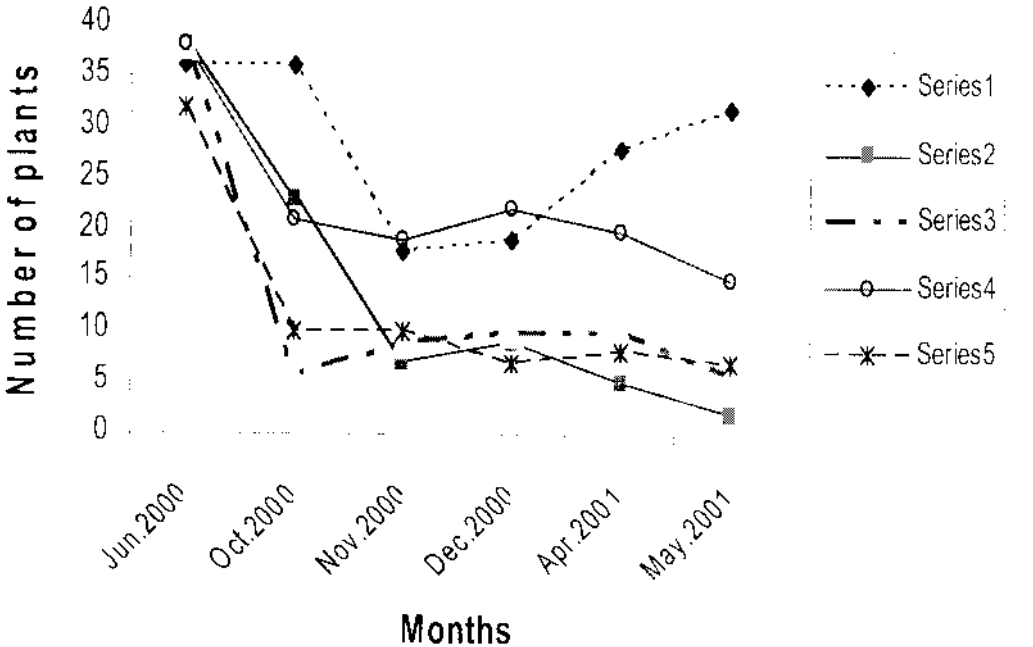

Fig.1: **Population trend of *T. angustata* in different treatments (See Table-1 for Series) during the year.**

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