



Asian Journal of Plant Sciences

ISSN 1682-3974

science
alert

ANSI*net*
an open access publisher
<http://ansinet.com>

Effect of Weed Seed of Barnyard Grass and NaCl on Growth of Rice

S.M. Alam and M.A. Khan

Plant Physiology Division, Nuclear Institute of Agriculture, Tandojam, Sindh, Pakistan

Abstract: It was observed from the results that treatments had no effect on seed germination of rice. Both shoot and root lengths were substantially decreased. Root length was affected more than the shoot growth irrespective of treatments.

Key words: Barnyard grass, NaCl, rice

Introduction

Barnyard grass (*Echinochloa crusgalli* L.) Is a robust, tufted and troublesome weed of rice. It is a summer weed with green or purplish flower and prefers warm and moist soil conditions. This weed produces about 7,200 seeds per plant. The presence of this weed in rice of field seems to be obnoxious and it reduces the yield of rice, significantly. Weeds are one of the major constraints to plant production world wide. When plants grow together they complete with each other both physically and chemically. Barnyard grass removes huge amount of nutrients especially N. Water extract of barnyard grass suppressed the germination and seedling growth of rice (Irshad, 2002) due to release of toxic substances (Chou and Young, 1975). Knowing the problem of allelopathy and salinity, an experiment was planned to study the effect of weed seed of barnyard grass and NaCl on the growth of rice.

Materials and Methods

The work was carried out at NIA, Farm, Tandojam during 1993. Weed seeds of barnyard grass were collected from matured weed plants growing in farm lands NIA, Tandojam, Sindh, Pakistan. The weed seeds were cleaned by hand and than sun dried in an open space. The experiment was conducted by placing weed seeds of barnyard grass in glass bowls of 250 ml capacity along with the rice seeds of cv. IR8-5. A 0.8% agar was prepared and the agar media was prepared and the agar media was incorporated with NaCl to get 0.0, 0.2 and 0.8% salinity levels. 50 ml of each salinized agar media was poured into sterilized glass bowl of 250 ml capacity for seed planting. Barnyard grass seeds were surface sterilized with 1% NaCl for 3 min and then rinsed with distilled water. Ten healthy rice seeds were placed in a circle on the surface of each level containing 0.0, 0.2 and 0.4% NaCl. Similarly, seeds of barnyard grass (0.5 g/bowl) were also placed

carefully in the same salinized agar media at the side of each rice seed. A set containing no weed seed and no NaCl was also kept and treated as control. All the bowls were then covered with sterilized petridishes and incubated at 28°C. The treatments were kept in a complete randomized block design (RCBD). The experiment was terminated after five days. The germinated seeds were counted and their root and shoot lengths measured and analyzed statistically.

Results and Discussion

The treatments had no effect on seed germination of rice (Table 1). The weed seed had no significant effect on shoot length. The 0.2% NaCl and 0.2% NaCl+weed seed significantly ($P<0.05$) reduced the shoot length by 18.6 and 24.1%. The greatest significant reduction (52.7 and 42.9%) were occurred at 0.4% NaCl and 0.4% NaCl+weed seed. Weed seed alone, 0.2% NaCl and 0.2% NaCl+weed seed had no significant effect on root length. The 0.4% NaCl and 0.4% NaCl+weed science significantly ($P<0.05$) reduced the root length (20.7 and 20.2%). Barnyard grass had been shown the process the ability to inhibit rice seeding growth by releasing toxic chemicals into the growing environment.

Barnyard grass has been considered as one of the 10 worst weeds. Bhowmik and Doll (1979) reported that the residue of barnyard grass inhibited hypocotyl growth of soybean. Aqueous extract of seeds reduced seed germination of several crop plants. At IRRI, it was reported that allelopathic rice cultivars are capable of reducing the root growth of barnyard grass substantially. Similar results have been reported for identification of allelopathic gemplasm in Korea, Australia and Cambodia (Olofsdotter *et al.*, 2002). In the present study, no effect was found on germination, but seedling lengths were reduced. It was also observed that shoot length was affected more than the root. The incorporation of weed

Table 1: Effect of weed seed of barnyard grass and NaCl on germination and seedling growth of rice

Treatments (Weed seed and NaCl)	Germination(%)	Shoot length(%)	Root length (cm)
Control (no weed seed, no NaCl)	83	4.31 a*	10.11a
Weed seed alone	83	(-)	(-)
0.2% NaCl alone	90	3.83ab	9.59a
0.2% NaCl+weed seed	87	(-11.14)**	(-5.15)
0.4% NaCl alone	83	3.51 b	9.82a
0.4% NaCl+weed seed	97	(-18.57)	(-2.87)
		3.27b	9.35a
		(-24.13)	(-7.52)
		2.04c	8.02b
		(-52.67)	(-20.68)
		2.46c	8.07b
		(-42.93)	(-20.18)

* Means followed by different letters differ significantly at $P < 0.05$

** Values in parentheses indicate percent increase (+) or decrease (-) over control

seed did not seem to minimize the effects of NaCl on the seedling growth of rice. On the other hand, both stress have inhibitory effects on seedling growth.

References

- Bhowmik, P.C. and J.D. Doll, 1979. Evaluation of allelopathic effects of selected weed species on corn and soybean. Proc. North. Cent. Weed. Control Conf., 34: 43-45.
- Chou, C.H. and C.C. Young, 1975. Phytotoxic substances in twelve subtropical grasses. J. Chem. Ecol., 1: 183-189.
- Irshad, I., 2002. Barnyard grass a serious rice weed. The Dawn (Karachi), Dawn Economic and Business Review. Dec-Jan., 21-27, pp: 3.
- Olofsdotter, M., L.B. Jensen and B. Courtois, 2002. Improving crop competitive ability using allelopathy - an example from rice. Plant Breeding, 121: 1-9.