

Weed Management in Pearl Millet

Todar Mal Poonia and Ankur Chaudhary

Department of Agronomy, CCS Haryana agricultural University, Hisar – 125004 (Haryana), India

*Corresponding Author: todarmal.poonia6@gmail.com

Millets, the earliest domesticated food crops in Asia and Africa, are grouped in two groups. The first group comprised of Pearl millet and sorghum categorized as major millets while finger millet, barnyard millet, little millet, foxtail millet, kodo millet, proso millet and brown-top millet are grouped as minor millets. They are the major crops of the semi-arid regions of the country, and have the potential to contribute substantially for food, fodder and nutritional security. Traditionally millets are cultivated on marginal lands with low or no inputs resulting in low yield. However, with the use of hybrids and with improved production technologies, the productivity of major millets has improved a lot.

Pearl millet is the fourth most important food grain crop in India after rice, wheat and sorghum. Pearl millet can tolerate drought, low fertility, and high temperature. It is a summer annual crop well suited for double cropping and crop rotation. Pearl millet contains phytochemicals that lower cholesterol. It also contains folate, magnesium, copper, zinc, and vitamins E and B-complex. It is a sensitive crop concerning biotic & abiotic stresses; weeds are a major constraint. Weeds compete with crop for nutrients, soil moisture, space and sunlight. Millets are poor weed competitors in the early stage of growth. Among the biotic factors, weeds cause maximum yield reduction in different crops. Presence of weeds in general reduces crop yields by 31.5% in winter, 22.7% in summer and 36.5% in Kharif season and some cases can cause complete devastation of the during the rainy season. Pearl millet is grown in kharif season, hence most of the rainy season weeds including grassy, broad leaved and sedges infest the crop. In Haryana, pearl millet is infested by more than 15 weeds species of different groups. *Trianthema portulacastrum*, *Digera arvensis*, *Amaranthus viridis*, *Phyllanthus niruri*, *Physalis minima* and *Mollugo pentaptyhla* are dominant broad leaf weeds whereas *Dactyloctenium aegyptium*,

Echinochloa colona, *Digitaria sanguinalis* and *Cenchrus echinatus* are most prevalent grassy weeds and *Cyperus rotundus* among sedges infesting the pearl millet crop. The infestation of dominant weeds in a field can be used in chalking out a sound management strategy for the farmers.

Weed management is an important factor for enhancing the productivity of pearl millet, as weeds compete for nutrient, water, light, and space; reduce crop yield and quality with crop plant during the early growth period. Pearl millet grows slowly at first and is a relatively poor competitor with weeds during the first few weeks of development.

There are three main methods of weed management in pearl millet:

Cultural methods

These methods involve manipulating the environment to create conditions that are unfavorable for weeds. This can be done by following techniques:

- Preparing the seedbed well to ensure good aeration and germination of crop.
- Planting the crop at the optimum time and spacing.
- Rotating crops with other crops that are not susceptible to the same weeds.
- Using cover crops to suppress weeds.
- Growing of intercrops like mungbean, cowpea etc. as intercrops in pearl millet could exert smothering effect on weeds.
- Narrow row spacing, use of higher seed rate
- Proper placement of fertilizers
- Mulching: A variety of mulch can be used such as straw.

Manual and mechanical methods

These methods involve using tools to remove weeds from the field. Manual and mechanical weeding is by far the most widely followed method of

weed control in millets. Hand weeding or inter-row cultivation provides reasonable weed control. However, during kharif season, inter-culture operations have to be delayed due to frequent rains and weeds overtake the crops and cause severe reduction in yield. Non availability of labour as and when required and higher cost is also a major constraint in adoption of manual weeding option in millet crops.

Chemical methods

These methods involve using herbicides to kill weeds. Herbicides can be applied pre-emergence (before the weeds emerge) or post-emergence (after the weeds emerge). Herbicides can be used to control a wide range of weed species in pearl millet. However, it is important to use herbicides carefully and according to the label instructions. Some herbicides can be harmful to pearl millet if they are not used properly. Atrazine along with one hoeing is used to control weeds in pearl millet crop. At CCS HAU, Hisar atrazine provided excellent control of *T. portulacastrum* and *Echinochloa* but not effective against *C. rotundus*. Atrazine 0.75 kg/ha fb 2,4-D 0.5 kg/ha and atrazine at 1.0 kg/ha as pre-emergence application provides effective control of weeds and comparable yield to the mechanical weeding. Atrazine application effectively controls the broad leaf weeds while poor against *Cyperus rotundus*. So, *Cyperus rotundus* has become most problematic weed in Pearl millet. At SKNAU, Jobner, Rajasthan, deep summer ploughing + tembotrione 100 g/ha (PoE) treatment effectively control the *Cyperus rotundus* and all other weeds resulting in higher pearl millet yield. At Gujarat, farmers are advised to carry out inter culture and hand weeding at 20 and 40 DAS or apply recommended atrazine 500 g/ha as pre-emergence for weed management. So for effective weed management in pearl millet atrazine 500 g/ha can be applied as pre-emergence of early post-emergence at 10-15 days after sowing.

The best method of weed management for pearl millet will vary depending on the specific weed species present, the location of the field, and the resources available. However, a combination of cultural, mechanical, and chemical methods is often the most effective way to effectively control weeds and achieve high yields of pearl millet.



Fig 1. Atrazine effect on *Amaranthus*



Figure 2. Atrazine use in pearl millets

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