

Integrated weed management in minor millets



R.P. Dubey, V.K. Choudhary and Chethan C.R.



ICAR–Directorate of Weed Research
Jabalpur, Madhya Pradesh- 482004



Introduction

Minor millets are small-seeded coarse-grain cereal crops grown for food purposes. These crops are predominantly grown in poorly fertile soils with minimal inputs and management, hence, the productivity is quite low, which needs to be increased through the development of better genotypes and management practices. The common practice is to broadcast the millet seeds in the field with the onset of the monsoon. Very little or no fertilizer is applied. Besides poor crop management, biotic constraints posed by weeds have been considered the most limiting factor in the production of millets. Weeds compete with crops for nutrients, soil moisture, space and sunlight when these are limiting, resulting in reduced yields, lower grain quality, increased production costs, and enriching the weed seed bank in soil. In addition to a reduction in yields, many weeds also serve as hosts for various insect pests and diseases. At harvest, weed seeds may contaminate with small millet seeds, resulting in poor quality of produce.

Major weeds of minor millets

The minor millets are mostly grown in the *kharif* season, hence these crops encounter the most common rainy season weeds. Most dominant being *Echinochloa colona*, *Paspalidium flavidum*, *Dinebra retroflexa*, *Cynodon dactylon*, *Cyperus rotundus*, *Cyperus iria*, *Physalis minima*, *Convolvulus arvensis*, *Mecardonia procumbens*, *Mollugo verticillata*, *Euphorbia geniculata*, *Phyllanthus simplex*, *Amaranthus viridis*, *Alternanthera sessilis*, *Commelina benghalensis*, *Trianthema portulacastrum* and others.



Echinochloa colona



Cynodon dactylon



Physalis minima



Commelina benghalensis



Trianthema portulacastrum



Amaranthus viridis



Euphorbia geniculata



Alternanthera sessilis



Cyperus rotundus

Minor millets are poor weed competitors in the early stage of growth due to slow growth and thin seedlings. In central India, the yield loss due to weeds in finger millet was estimated to be 46.6 to 68.1%, in kodo millet 56.6 to 67.3% and in barnyard millet it was 63.5%.



Finger millet crop severely infested with weeds

The ICAR-DWR has developed a technology for managing weeds effectively in minor millets. The developed weed management technology will empower the small and marginal farmers to effectively manage weeds and obtain higher yields.

Details of the technology

- In contrast to broadcasting of seeds, seedlings are raised in a nursery like that of rice. Twenty-five days old seedlings of minor millets i.e. finger millet (GPU 45), kodo millet (JK 137) and barnyard millet (VL 29) are transplanted at a spacing of 30 x 10 cm in a well-prepared field in the first week of July. Unlike rice, no puddling of field is done, and transplanting of 1-2 seedlings is done when there is adequate moisture in the field either through rains or light irrigation. A fertilizer dose of N 60 kg (in two equal splits; basal and 40 days after planting) and P_2O_5 40 kg /ha (full dose as basal) is applied to the crop.
- In finger millet, herbicide pyrazosulfuron 20 g/ha is applied on soil next day of planting by knapsack sprayer using 500 liters water. Thereafter, at 30-40 days after planting one light hand weeding is done. This technique controls all categories of weeds within the critical period of weed competition.



Pyrazosulfuron 20 g/ha *fb* 1 HW at 40 DAP

- In kodo millet, pendimethalin 675 g/ha is applied on soil next day of planting by knapsack sprayer using 500 liters water. Thereafter, at 30-40 days after planting one light hand weeding is done. This technique controls all categories of weeds within the critical period of weed competition.



Pendimethalin 675 g/ha *fb* 1 HW at 40 DAP

- In barnyard millet, atrazine 750 g/ha is applied on soil next day of planting by knapsack sprayer using 500 liters water. Thereafter, metsulfuron 4 g/ha is applied on the crop and weed at 25 DAT by knapsack sprayer using 375 liters water. This technique controls all categories of weeds within the critical period of weed competition.



Atrazine 750 g/ha *fb* metsulfuron 4 g/ha 25 DAP

- The other recommended agronomic package of practices are followed to raise the crop till harvest.

Economics

This technology in comparison to farmer's practice (poor weed control and crop management) gave 114% gain in productivity with a BC ratio of 3.14 in finger millet, 127% gain in productivity with a BC ratio of 4.86 in kodo millet and in barnyard millet, 78% gain in productivity with a BC ratio of 2.52.

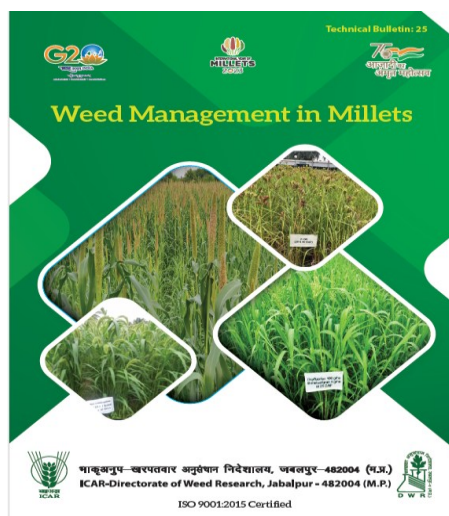
Other benefits of the technology

- No puddle condition reduces the water requirement of the crop

- Reduced soil compaction, which helps better germination of the succeeding crop
- Adds up to nutritional and livelihood security of the millet farmer.

Upscaling strategies

- Farmers growing minor millets usually broadcast the seeds in poorly prepared fields. Non-puddled transplanting of minor millets in a well-prepared field will ensure optimum plant population and robust plants. Hence, this technology needs to be up-scaled in areas of minor millet farming through demonstrations and awareness programmes by extension officials.
- Weed management in minor millets is not taken seriously, resulting in poor productivity. The developed technology for weed control in finger millet, kodo millet and barnyard millet will give a boost to enhance the productivity of minor millets. Creating awareness about the crop losses due to weeds and demonstrating the technology at farmers' fields will help to bring more farmers towards millet cultivation.



For more information contact

Director, ICAR-Directorate of Weed Research
Maharajpur, Adhartal, Jabalpur – 482004, Madhya Pradesh



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फोन / Phones: +91-761-2353001, 23535101, 23535138, 2353934, फैक्स / Fax: +91-761-2353129

ई-मेल / Email: director.weed@icar.gov.in वेबसाइट / Website: <http://dwr.icar.gov.in>

फेसबुक लिंक / Facebook Link- <https://www.facebook.com/ICAR-Directorate-of-Weed-Research-101266561775694>

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