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## Broad-leaf weed management in rice

- The critical period for weed management is 30-45 days after transplanting and 15-45 days for direct seeded rice.
- Knowledge on whether a weed is annual or perennial is important in effective control of the weed. Annual weeds grow and produce seed within a year before dying off. They are effectively managed before flowering. Perennial weeds continue growing after producing seed and may grow for several years. They have underground propagative structures e.g. rhizomes, bulbs, stolons. Perennial weeds are best managed by targeting the underground structures.

### 1. Cultural methods

#### Preventive methods

One of the most important step in weed management is preventing entry of weed into the rice field. Some weeds are difficult to eradicate once established in the field. Prevent weeds from getting into the rice field by:

- Use certified seed free of weed seeds.
- Establish seedlings in weed-free nursery.
- Use clean and weed free tools and machinery.
- Clean and remove weeds from the irrigation channels.
- Ensure that field borders are kept clean.

### Land preparation

- Ensure that land preparation activities including ploughing, harrowing and puddling are adequately practised (*Refer to agronomy factsheet*). Land preparation ensures that weeds are buried deep; germination delayed or halted; and exposes underground propagative structures e.g. rhizomes, bulbs, stolons to direct sunlight leading to their desiccation. The interval between the ploughing and harrowing should be long enough to allow weeds grow then they are later killed by harrowing. This reduces amount of weed seeds in the soil.
- Ensure tillage is undertaken during the dry season.

### Planting method

- Plant rice in straight rows to allow for ease access during weeding.
- In irrigated rice, ensure that the field is flooded immediately after transplanting and the flooding maintained during the vegetative stages of rice growth.

### Crop rotation

- Crop rotation leads to a reduction in the build-up of weeds. Crop rotate rice with a broad-leafed crop to allow effective management of grasses with herbicides.

### Selection of appropriate rice variety

- Grow varieties that produce many tillers early during rice growth. These have a high competing ability with the weeds.

### Good agronomic practices

- Apply appropriate agronomic practices (*Refer to agronomy factsheet*). A healthy rice crop is able to effectively compete with weeds

### Weeding practices

- Apply various weeding practices in rice field. Weeding can be done manually by hand pulling or using hand tools like hoe, spade; or using a mechanised a weeder may also be used. Weeding should be undertaken 20-42 days after transplanting.

### 2. Biological control

- *Water hyacinth*, apply biological control using *Neochetina bruchi* and *N. eichhorniae* beetles. It has been estimated that a minimum of 5 beetles per plant are required.

*Efficacy of biocontrol methods are not immediately achieved and requires sufficient amount of time for the full benefits to be realised.*

**Contact experts:** Mutiga, S., ([Mutiga@uark.edu](mailto:Mutiga@uark.edu)), Mwongera, D., Kirigua, V., Otipa, M., Kimani, J., Mugambi, C., Ngari, B., Ochieng, V., Wasike, V., Wandera, F., Wasilwa, L., Nyamongo, D., Too, A., Nyongesa, O. (IRRI); Zhou, B. (IRRI); Mitchell, T. (OSU); Wang, G. L. (OSU); Were, V. (TSL); Ouedraogo, I. (INERA); Rotich, F (UoEm); Correll, J. C. (UARK) and Talbot, N. J. (TSL). *E-Guide for Rice Production in East Africa (2019)*

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### 4. Use of Herbicides:

- Apply selective herbicides after 7-10 days after transplanting. The following post emergence herbicides may be used.
  - Satunil 60 EC (Thiobencarb 40% w/w + Propanil 20% w/w) at a rate of 4-6 L/ha.
  - Garil EC (Triclopyr 72g/L + Propanil 360) at a rate of 5 L/ha
  - Sanaphen D SL (2,4-D Dimethyl amine (equal to 720g/L amine salts 600g/L) at a rate of 1-4l/ha.

The herbicides are most effective when applied at 2-4 leaf stage (less than 1 inch tall). For irrigated rice, drain the water and apply when the field is wet. Re-flood the field 1-2 days after application.

- To control perennial weeds with underground reproductive structures (bulbs, rhizomes or stolons), apply systemic glyphosate-based herbicides such as Roundup, Eraser 480 SL, Touchdown forte 500 SL before planting rice. Repeat application of the herbicide to eradicate the weed.

*The use of herbicides to control aquatic weed e.g. water hyacinth and water lettuce is not recommended because it poses a risk of contaminating sources of drinking water.*

### Safe use of herbicides

Improper use of herbicides can cause serious damage to crops, humans, fish, livestock and the environment. It is therefore very important to ensure that herbicides are used safely.

- Always follow the manufactures instructions.
- Always ensure that handlers and sprayers wear protective clothing including rubber boots, long trousers, long-sleeved shirt, rubber gloves and goggles.
- Ensure the spraying equipment is well maintained and that there are no water leaks in the system.
- Do not eat, drink, smoke while spraying.
- Avoid spraying when its windy to ensure the herbicide doesn't drift to unwanted areas.
- Mix herbicides in well ventilated place.
- Wash yourself and equipment' after spraying.
- Avoid buying herbicides in large quantities that will require storage. Buy enough herbicides for the work.
- In the event some herbicide is left over, store under lock and key, and away rom food items.
- Herbicides must be stored in their original containers.

### 5. Integrated weed control

- Apply a combination of both direct (e.g weeding and herbicides) and indirect methods (land preparation, crop rotation, good agronomic practices) discussed above for effective management of weeds in rice. The methods selected should provide adequate weed control in a cost-effective, safe and environmental -friendly manner.

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