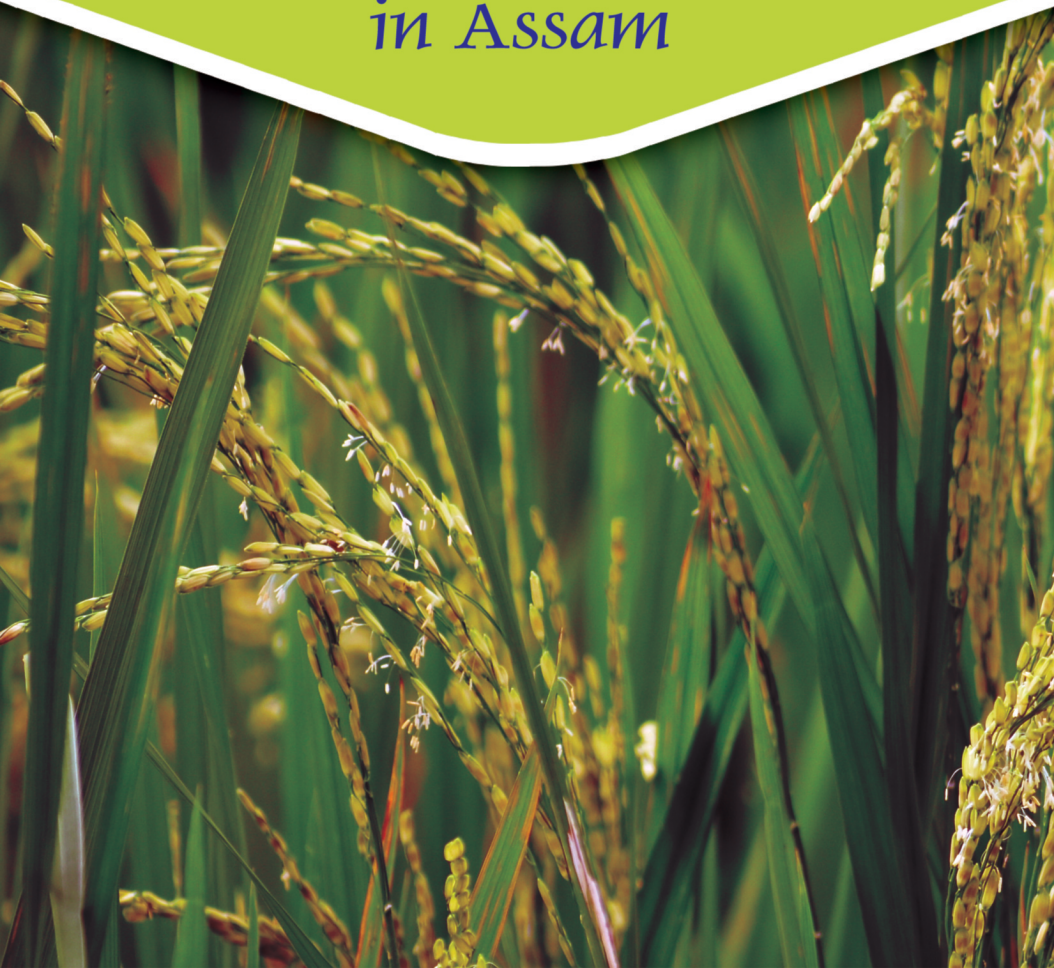


Best Management Practices for Sali season in *Transplanted Rice* in Assam



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Varieties

The high yielding long-duration varieties such as Swarna-Sub1, Ranjit-Sub1 and Bahadur-Sub1, are able to tolerate complete submergence for two weeks. Depending on flood-water quality, the submergence-tolerance period may vary. Turbidity of water hinders radiation to reach plants, thereby impacts the photosynthesis process in plants. BINA Dhan 11, a medium-duration submergence-tolerant rice variety could be grown in all Assam districts including the areas having low rainfall, and under delayed post-flood sowing conditions mostly prevalent in upper Brahmaputra valley zone. The varieties for different growing situations are listed below along with their brief characteristics description.

Variety	Days to maturity	Grain type	Plant height (cm)	Yield (t/ha)	Salient features
Swarna-Sub1	140-145	Medium bold	100	5.5-6.0	Suitable for cultivation in lowland areas. Submergence tolerance up to two weeks. However, if stagnation prolongs for more than a month over 25 cm water depths, tillering is drastically reduced.
Ranjit-Sub1	150-155	Short fine	115	5-5.5	
Bahadur-Sub1	150-155	Medium bold	115	5-5.5	
BINA Dhan 11	115-120 days during <i>Sali</i> season, may extend to 135 days in <i>Boro</i> season	Medium Slender	107-115	5.5-6.0	Suitable for medium shallow land. Submergence tolerance up to two weeks. Shorter duration may permit delayed transplanting/sowing, and timely maturity help escaping drought.

Seed quality and treatment

Seed quality: Quality seed is clean (contains no pebbles, soil particles, weed seeds), genetically pure (contains only grains of one variety) and healthy (well filled, of the same color, without cracks, and no obvious disease- or pest-damage).

Seed selection: Seeds are immersed in plain water and stirred well. Seeds, those sink down are selected, and those float are rejected.

Seed treatment: Adopt seed treatment with recommended fungicides only. Once the selection process is done, the seeds should be soaked directly in one of the following fungicidal suspensions for 12 hours. One liter of fungicidal solution is required to treat one kg of seed. Treated seeds should be kept in incubation for 48-72 hours.

Fungicide	Dose (g/kg seed / liter of water)	Use
Chlorothalonil 75% WP	2	To avoid damping off, wilt and root -rot in seedling stage
Carboxin	2.5	
Trifloxystrobin 25% WP	1.5	

Safety precaution: Plastic gloves should be used while handling chemicals to avoid ill- effect on health

Nursery raising

- **Time of sowing :** Last week of May to the first week of June is the most appropriate time for raising a nursery.
- **Seed rate :** 40 kg per hectare
- **Nursery size :** For one hectare of the main field, the nursery seed bed size should vary between 750 and 1000 m² but should not be more than 1/10th of the main field size. Land is thoroughly puddled and seed beds of 10 m length, 15 cm height and 1.5 m breadth are prepared keeping a 60-cm gap in between the beds. The length of the bed may vary according to convenience and availability of space.
- **Irrigation:** Irrigate to maintain saturated condition in the surface soil of the seed beds. Maintain 2-3m standing water 2-3 days prior to uprooting.
- **Plant protection:** Adopt plant protection measures in the standing nursery as per standard package of practices
- **Nursery fertilizer:** Use 3-1-2 g N-P₂O₅-K₂O+2 kg manure per m² i.e., equivalent to 3-1-2 kg N-P₂O₅-K₂O+2 tons manure in 1000 m² of nursery area for one-hectare main field.

When?	What?	How much? (g/m ² or kg/1000 m ²)		Application method
		Through DAP	Through SSP	
Basal (Same day as sowing)	Manure	2000	2000	Soil incorporation
	Urea	5.6	6.5	
	DAP	2.2	-	
	SSP	-	6.3	
	MOP	3.3	3.3	

Main field preparation

For preparation of the main plot, the following points should be kept in mind -

- Field should be prepared thoroughly by ploughing with *desi* plough 4 times, followed by harrowing and laddering.
- Ploughing should be started at least 2-3 weeks ahead of transplanting so that weeds are dried-up/decayed.
- Alternatively, one pass of mouldboard plough followed by one or two passes of modified helical blade puddler are sufficient for obtaining good quality puddled soil.
- The ploughing intervals should be spaced such that the weeds germinated after the first round of ploughing are knocked down in the next round.
- If available, apply compost or manure uniformly prior to field preparation, and mix it well with the soil.
- Repair the bunds to reduce water losses from the field during the cropping season.
- Level the fields, best by maintaining a shallow water layer in the field.

The basal fertilizer dose is applied to the field (see fertilizer section below).

Transplanting

- Seedling age: 30-35 day old seedlings for long duration, 25-30 day old seedlings for medium duration, and 20-25 days old seedlings for short duration varieties, are transplanted in a thoroughly prepared main field.

- Spacing: 20-25cm x 15cm (8-10 x 6 inches)
- Seedling density: -3 seedlings per hill.
- Depth of seedling: -5cm

Fertilizer

For transplanted rice, fertilizer recommendation per hectare is 60-20-40-5kg of N-P-K-Zn. The base nitrogen dose is split into 3 equal applications- 1/3rd as basal, 1/3rd at tillering, and 1/3rd at panicle initiation. Under submerged condition, additional 20kg N and 20kg K₂O is applied 5-7 days after recession of flood to facilitate regeneration, and boost recovery from flood-shock. The detailed schedule and method of applying all nutrients is given in the table below:

Stage of fertilizer application	Name of fertilizer	Fertilizer application				Application Method
		(kg/ha)		(kg/bigha)		
		Through DAP	Through SSP	Through DAP	Through SSP	
Basal	Urea	23	40	3	6	Broadcast & Incorporated in soil at the time of field preparation
	DAP	44	-	6	-	
	SSP	-	125	-	17	
	MOP	67	67	9	9	
	ZnSO ₄	25	25	3	3	
Maximum Tillering (20-25 DAT) after 1 st weeding	Urea	45		6		Broadcast
Panicle initiation (40-45 DAT), after second weeding	Urea	45		6		Broadcast
5-7 days after flood recedes	Urea	45		6		Broadcast
	MOP	33		4.5		

DAT= Days After Transplanting

Note:

- Stop urea broadcast, in case Bacterial Leaf Blight symptoms appear.
- Apply in soils deficient in zinc, once in three years.
- As far as practicable, drain out standing water before fertilizer application.

Weeding: Keep the field weed-free, especially during the early phase of crop growth. Weeds cause maximum damage in the early phase of the crop growth. But the later control is also important to prevent seed-setting by the weeds. Two weeding are done manually or mechanically (using paddy weeder or power weeder); first at 3 weeks after, and second at 6 weeks after transplanting.

Herbicides: Herbicides should be selected based on presence of weed flora, and considering even previous weed pressure in the field.

Herbicide application

- **Equipment :** Given their superior effectiveness, herbicides should only be applied using multi-nozzle boom fitted with flat-fan nozzles. While spraying, the new spray-swath should always overlap 25 % of the previous spray-swath margin to ensure uniform application.
- **Pre-emergence (PE) herbicides:** Most PE herbicides require moisture at the soil surface at the time of application. Without sufficient moisture, the PE herbicide will not be much effective.
- PE herbicides can be used by splash method in 3-5cm standing water in the field, preferably within 2-3 days after transplanting
- PE herbicides supplemented with one hand-weeding will be more effective to take care of the germinated weeds, and the weeds emerging later in the season.
- **Post-emergence (PE) herbicides:** Herbicides, if required, should be applied between 20-25 DAT when weeds attain leaf stage. Ensure that there is no standing water in the field however, the field should have moisture at the time of PoE application.
- **Spray volume:** Use spray volume of 300 liters/ha in all herbicide applications.

Herbicide safety

- Read the label prior to use to understand both the toxicity level and the safety measures required.
- Plastic gloves, goggles or face-shield, and full clothing should be worn by the person while mixing, and during application of the herbicides.

- Post-application, all clothes need to be washed separately from the family laundry.

Select suitable and need based herbicide (s) from the table given below

Table: Herbicides, their doses, time of application and type of weed flora they kill in paddy field

When does it kill weeds	Chemical Name	Dose (ai g/ha)	Type of weeds it kills		When to apply	Commercial dose (g or ml/ha)	Commercial dose (g or ml/Bigha)
Pre-emergence	Pretilachlor 50% EC	750	Narrow leaf	Some Broad leaf	2-3 DAT	1500 ml	200 ml
	Pyrazosulfuron Ethyl 10% WP	25	Narrow leaf (sedges)	Some Broad leaf	2-3 DAT	187.5 ml	25 ml
	Oxadairgyl 80% WP	100.0	Narrow leaf	Some Broad leaf	2-3 DAT	125 g	16.6 g
Post-emergence	Bispyribac-sodium 10% EC	25	Narrow leaf (Grasses + sedges)	Some Broad leaf	20-25 DAT	250 g	33 g
	Chlorimuron ethyl 10%WP + Metsulfuron methyl 10%WP	25	Broad leaf	Some sedges	20-25 DAT	20 g	3 g
	Pyrazosulfuron Ethyl10% WP	25	Narrow leaf (sedges)	Some Broad leaf	20-25 DAT	250 g	33 g

DAT= Days after transplanting.

Given below are some of the recommended herbicide-combinations. Depending on weed-flora, follow the application timing and doses as per above table:

- Pretilachlor (PE) *fb* Bispyribac-sodium (POE)
- Pretilachlor (PE) *fb* Bispyribac-sodium + Pyrazosulfuron (POE)
- Pretilachlor (PE) *fb* Bispyribac-sodium + Pyrazosulfuron (POE) *fb* Spot hand weeding

* *fb* : followed by

Irrigation: In *Sali* season, in the absence of rain, application of 5 cm irrigation water 3 days after disappearance of ponding water is recommended.

Plant protection measures: It is applied, if threshold levels of pests are present in the field. Follow plant protection measures as per State recommendations.

Harvest and post-harvest

- Harvest when 80-85% of the grains attain physiological maturity i.e. visually straw-colored.
- Minimize the time during which the harvested plants remain in the field and avoid field drying. Make sure that the panicles stay dry.
- Thresh and dry within two days after harvesting. It is advised to adopt mechanised drying using a solar bubble dryer. In the absence of mechanised drying, alternatively follow sun drying on a mat or plastic sheet, keeping the thickness of the grain layer a 3 to 5 cm.
- Clean thoroughly by winnowing. Store the rice in a cool, dry, and clean area

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