

S. No	Diseases	Damage	Control	Reference
1	Downy Mildew (<i>Sclerospora graminicola</i>)	- It affects leaves and ears of the plant - The appearance of downy growth is on the lower surface of the leaves - Yellowing and wilting of leaves - Stunted ears growth - Reduced yield and quality	- Rotate crop to reduce disease pressure - Remove and destroy infected plant debris to prevent the spread of the disease - Fungicide are most effective when use as preventive measure - Use Copper-I-Oxide 60% WP at rate of 500g-1kg/ha	
2	Rust (<i>Puccinia Spp</i>)	- Orange or brown rust pustules on leaves, stems and grains - Reduced Photosynthesis - Stunted growth and deterioration of quality characters	- Crop rotation practices to disrupt disease cycle - Remove and destroy infected crop to prevent spread pf disease - Use Metalaxyl 12% + Copper-I-Oxide 60% WP at rate of 500g-1kg/ha	
3	Blast (<i>Magnaporthe grisea</i>)	- Formation of lesions on leaves, stem and panicles - This leads to decay of the affected parts - This leads to yield reduction and grain quality deterioration	- Ensure proper spacing between plants for good air circulation - Tricyclazole is the most effective fungicide - Use Metalaxyl 12% + Copper-I-Oxide 60% WP at rate of 500g-1kg/ha	
4	Smut (<i>Sporisorium cruentum</i>)	- Formation of smut balls in the panicle - Loss of yield and grain quality	- Use of resistant varieties - Avoid excessive nitrogen fertilization - Soil solarization with white polythene and grass mulch to reduce the incidences of the disease	

S. No	Pest	Damage	Control	Reference
1	Head miner	- This the major pest of millet in West Africa - The immature larvae feed on the panicle and prevent grain formation - Yield loss ranges from 40-85%	Spray Cypermethrin and DDVP at rate of 2-3L/ha	
2	Stem borer	- Larvae bore into the stem causing dead hearts, this weakened the crop causing them to fall over - The larvae attack the growing point of the leaves - Reduction in yield	- Plant early to avoid heavy infestation - Intercropping with non-hosts crop to confuse the moth - Apply Furadan at 0.75kg a.i/ha; or - Emamectin benzoate 5% WDG at 100g/ha	
3	Blister beetles	- They are found in clusters and often in high numbers in localized areas - They feed on millet flowers and developing grains - They contain cantharidin toxin in their body fluids - Reduction and total loss of yield	- Planting early to avoid heavy infestation - Apply Cypermethrin or DDVP at rate of 2-3L/ha to control the beetles	

S. No	Nutrient	Deficiency Symptoms	Reference	Healthy Millet	Reference
1	Nitrogen	- Pale yellow color of leaves - Old leaves turn yellow - The yellowing starts from the tip and spreads to the rest of the plant - Reduced plant height and overall growth		- Green Foliage - Helps with photosynthesis - Stimulates vegetative growth	
2	Phosphorus	- Distinct purple coloration of older leaves and stem - Reduced flowering and seed formation - Poor development of the root system		- Encourage healthy root development - Provide strong stems and leaves - Promote fruit development	
3	Potassium	- Yellowing of tips or margin and between the veins leading to curling - Stunted growth - Stems may become weak and susceptible to lodging - Reduced disease resistance		- Regulate water uptake - Promote strong growth - Increase disease resistance - Enhance quality millet	

INDORAMA GRANULAR UREA



- Uniform granule size.
- Low moisture, anticaking properties, low biuret content & Free flowing.
- Higher crushing strength, which prevents caking.
- Standards Organization of Nigeria (SON) Certified.

INDORAMA NEEM COATED UREA



- Enhances the nitrogen use efficiency and crop remain green for longer time.
- It increases crop productivity
- Protect crop from pest and diseases.
- Prevent Urea application losses by Volatilization and Leaching.

INDORAMA NPK



- Indorama NPK maintains quality and have a perfect balance of nitrogen, phosphorus, and potassium.
- Nitrogen is needed for vegetative growth.
- Phosphorus is needed to produce strong roots and shoots.
- Potassium is needed to produce quality fruit and flowers, also increases resistance to diseases.
- Calcium from limestone granules helps in decreasing soil acidity.

INDORAMA
Essential materials. Better lives.



Millet

Nigeria's Nutrient Dynamo, Cultivated for You

Millet is one of the important cereal crops for the arid and semi-arid tropics of Asia and Africa particularly Nigeria and Niger providing grain for human consumption and stover for livestock. It sustains one-third of the world population and is a significant part of the diet in Northern China, Japan, Africa, India, and Egypt. The crop thrives well in locations where rainfall does not last long enough to deter its growth. India is the largest producer of millet with 37.5% of the total global output followed by Sudan and Nigeria. Annual pearl millet production in Nigeria is 2.0 million tons with an average yield of 1.0m mts per hectre. Over 30% of croplands are devoted to millet in Borno and Adamawa States. Other States include Sokoto, Kebbi, Yobe, Kano, Zamfara and Gombe.



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OF NIGERIA



MILLET CROP

Land Preparation and Soil Requirement

- Optimum temperature for millet production is 31°C
- Millet is drought resistant and uniquely well-adapted to harsh environmental conditions.
- Optimum rainfall requirement for production is between 250-650mm.
- Millet is adapted to a wide range of soil types (sandy loam to clay loam).
- pH range of 5.8-6.5 is optimum for millet production.
- The land should be ploughed, harrowed and ridged.
- Ridging is done at the spacing of 75cm.
- Apply 6-10tons of farm yard manure to improve soil conditions during ploughing.
- Apply pre-planting herbicide (Glyphosate at the rate of 4 L/ha) 2 weeks to harrowing.
- In most of traditional millet growing areas tillage activity that involve harrowing, and ridging may not be required due to presence of sandy soils.



Seed Rate and Time of Sowing

- Obtain seed from reputable licensed seed companies or research institutes.
- Some common varieties of millet in Nigeria include,
 - LCICMV-4 (Jirani) – Extra early variety suited to areas with less rain
 - LCICMV-3 (Supersosat) – High yielding, resistant to downy mildew disease
 - LCICMV-1 (SOSAT-C88) – Food taste preferred by 99% users, thick stem for fencing, high grain yield and earliness
 - SAMIL-5 (Maiwa Composite) – Strong stem and adapted to Sudan and Guinea Savanna.
- The recommended seed rate is 10-15 kg /ha.
- Seed should be treated using a dressing chemical (Apronstar or DressForce a.i 20% Metalaxyl + 20% Imidacloprid) at the rate of 10g per 4kg of the seeds.
- Seeds are sown at the rate of 3-5 seeds per hole at a depth of about 3-5cm.
- Spacing between plants (intra row) should be 25cm while the spacing between ridges (inter row) is 75cm.
- Sowing is done once rain is fully established.
- Timely sowing reduces the incidence of pests and diseases.
- Thinning out process to be carried out after 2 weeks of sowing.



Fertilizer Management with 4R Nutrient Stewardship

- Before fertilizer application, it is important to ensure that the soil is moist and weed free.
- Apply fertilizer at the rate of 60 kg Nitrogen: 30kg Phosphorus: 30 kg Potassium/ha.
- Apply 4 numbers of 50 kg bags (200kg) of Indorama NPK per hectare during land preparation.
- Top dress with 1.5 bags (75kg) of Indorama Neem Coated Urea at 3 weeks and 1 bag (50kg) at 6 weeks after sowing.
- Apply the fertilizer 10 cm away from the crop using dibbling method.



How to Reduce Fertilizer Loss

- Apply fertilizer early in the morning or in the evening time.
- Avoid fertilizer application when it is about to rain or when the weather is cloudy.
- Always apply Indorama Neem Coated Urea fertilizer in split doses for better efficacy.
- Side placement of fertilizer is recommended.
- Always cover applied fertilizer with soil to prevent volatilization losses.
- Apply nitrogen fertilizer after weeding to prevent weed invasion.
- Apply only the recommended dose of fertilizer.



Weed Control

- For pre-emergence herbicide, Apply Prometryn 15% + Acetochlor 25% E. C at 2-3 L/ha or 500 ml of isoxaflutole + aclonifene (50 + 330 g/L) immediately after sowing.
- Post-emergence herbicide (Nicosulfuron) can be applied at rate of 8.5g a.i/ha at 4 weeks after sowing.
- Alternatively, hoe weeding should be carried out at 3 and 5 weeks after sowing.
- Earthen-up should be done at 8-9 weeks after sowing.



Pest and Diseases Management

- Pests include: stemborers, weevils, millet midge, shoot flies, birds, and rodents.
- The major diseases of millet include downy mildew, smut, blast, and rust.
- Disease can be controlled by proper field sanitation, using of certified and resistant seeds and practice of crop rotation.
- Pests can be control by using scare crows and traps can be used against birds and rodents respectively.
- Use of bio-pesticides such as neem-extracts to control insect pests.



Harvesting

- Millet is ready for harvest between 50-90 days depending on the variety, physiological stage and temperature.
- Harvesting is done when the lower leaves turn yellow to brown, panicles are dried and point of attachment of grains turn black.
- Harvesting can be done manually with cutlass/hoe or mechanically using combine harvester.
- Grains should be properly dried to attain 10-12% moisture content.
- Store in cool, dry, well-ventilated, and rodent-proof conditions.



BEST FARMING PRACTICES

Indorama Fertilizer: Improving Agriculture, Improving Lives