



Diseases of Little Millet and their Management

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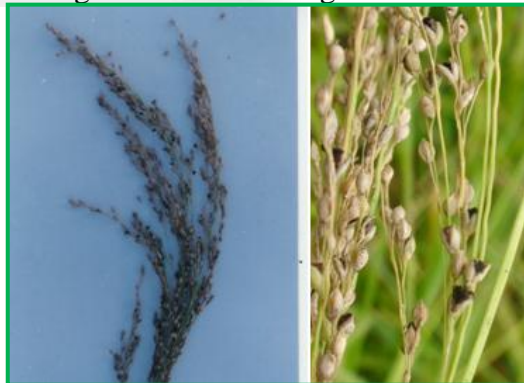
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Little millet (*Panicum sumatrense*), locally known as *kutki*, Mejhari, Medo, Sama is a small seeded cereal crop usually cultivated by tribal and poor farmers under extreme climatic conditions. Madhya Pradesh, Chhattisgarh, Jharkhand, Odisha, Andhra Pradesh and Tamil Nadu are major little millet growing states in the country. The crop is hardy and can stand both under water logging and drought conditions. Little millet is a rich source of complex carbohydrates, antioxidants and phenolic compounds which helps to prevent metabolic disorders like diabetes, cancer, obesity etc. Being eco-friendly, the crop is suitable for fragile and vulnerable agro-ecosystem. Grain smut, banded leaf and sheath blight, leaf blight, leaf blast, rust and Udbatta are important fungal diseases that cause considerable loss under favourable environmental conditions. Bacterial and viral pathogens are not reported in little millet but few phyto-nematodes viz. root knot nematode (*Meloidogyne incognita*), cyst nematode (*Heterodera delvi*), stunt nematode (*Tylenchorhynchus vulgaris*) and spiral nematodes (*Helicotylenchus dihystra*, *H. abunaamai*) were reported. Seed associated mycoflora like *Fusarium equiseti*, *F. sporotrichoides*, *Curvularia lunata*, *C. pallescens*, *Drechslera bicolor* from sterilized seed and *C. lunata*, *F. equiseti*, *F. sporotrichoides*, *Aspergillus niger*, *A. flavus*, *Rhizopus* sp. and *Mucor* sp. from non-sterilized seeds were found associated.

Major diseases of little millet

Grain smut: The disease is caused by *Macalpinomyces sharmae* and is quite prevalent in early maturing genotypes of little millet. In India, the disease was first reported from Dindori district of Madhya Pradesh and up to 50% plants/ grains were found affected by the fungal pathogen. Later on, the disease was also reported from Jharkhand, Chhattisgarh and Tamil Nadu states of the country in sporadic form. In farmers field grain smut average incidence was reported 18.02% in a range of 0.0 to 40.0% with 1.1% average smut severity. An avoidable loss ranging from 2.1 to 18.9% was reported in different varieties of little millet due to grain smut. Symptoms of the disease are visible at grain formation stage. The affected ovary is transformed into smut sorus, but does not increase in size than the normal grain. The glumes are pushed apart by the spore balls (sori), which are transformed instead of grains. The sorus is covered by thin dull delicate membrane, which pushed away easily leaving exposed sorus. The spores are easily blown away leaving nothing inside the spreaded glumes. Some of the late developing grains remain greenish and only slightly increased in size than the normal grains.



Management: The disease can be controlled by adopting resistant cultivars, cultural practices and chemicals.

- Late maturing cultivars may be used as compared to early maturing cultivars.
- Seed treatment with Carboxin @ 2 g per kg seed + one foliar spray of Carbendazim @ 0.05% at flower initiation stage is most effective, but only seed treatment with Carboxin or Carbendazim @ 2 g per kg seed is economical and effective.
- Little millet varieties namely OLM 203, GV 2 are resistant to grain smut.

Banded leaf and sheath blight (BLSB): The causal agent of the disease is *Rhizoctonia solani*. In India, the disease is reported from M.P., Jharkhand, A.P. and Chhattisgarh in moderate to severe form in different cultivars of little millet. Incidence of banded leaf and sheath blight ranging from 0.0 to 21.5% was recorded in farmer's field. Average reduction in plant height (14.7%), number of productive tillers plant⁻¹ (15.7%), panicle length (14.2%), panicle weight (12.8%), grain yield plant⁻¹ (17.8%), test weight (11.3%) and fodder yield plant⁻¹ (19.4%) was recorded. Characteristic symptoms of the disease is formation of large irregular lesions having straw coloured centre and a wide reddish brown margin on sheath and leaves of the plant. The initial lesions are small, ellipsoid or ovoid and usually develop near the water line in lowland field. The presence of several large spots on a leaf sheath usually causes the death of whole leaf.



Management

- Seed treatment with bio-control agents namely *Trichoderma harzianum* and *Pseudomonas fluorescence* @ 10 g kg⁻¹ seed was found effective against BLSB
- Seed treatment with Hexaconazole @ 0.1% and Validamycin @ 0.1% was found effective against BLSB
- Foliar application of non-conventional chemicals namely salicylic acid and sodium fluoride @ 200 ppm was found effective to induce resistance in little millet against *R. solani*.
- Use of resistant varieties like OLM 203,

Leaf blight: Leaf blight caused by *Alternaria alternata* is one of the emerging maladies in successful cultivation of little millet. In India, the disease was first reported from Bengaluru (Karnataka) in 2018 and up to 53 percent incidence was recorded. Later on the disease was recorded from Jagadapur (CG). Dark brown, circular to oval necrotic spots surrounded by concentric rings are formed on the upper leaf surface. As the disease progressed infected leaves became blighted.

Management

- Foliar spray of Hexaconazol, Tebuconazol 50% WG + trifloxistrobin 25% WG) and Mancozeb are effective to control the disease.
- Biocontrol agents like *Trichoderma harzianum* and *Bacillus velezensis* are found to reduce the disease incidence.
- Little millet varieties namely BL 6, OLM 203 and JK 8 are resistant to leaf blight.



Other diseases of little millet

Rust: The disease is caused by *Uromyces linearis* and has been reported from India, Philippines and Ceylon. In India, the disease was reported in moderate form from Coimbatore in different cultivars. Numerous, minute, narrow brown pustules arranged in linear rows appear on the upper surface of the leaves.

Leaf blast: Leaf blast for the first time has been recorded from Ranichauri (Uttarakhand) during 2014. In field, the disease manifested at grain formation stage and covered the leaf areas. The symptom appears on leaves in the form of spindle shaped spots that were of different sizes. Initially the spots were the yellowish margin and grayish centre. Later on centres became ash coloured. Under humid conditions, an olive grey overgrowth of fungus developed at the centre of spots. In the beginning, the lesions were isolated but coalesced afterwards.



Udbatta: In India, the disease was first reported from Bhubaneswar (Orissa) in 1965 and about 40-50 percent plants were found infected. Later, the disease was found prevalent to a greater intensity during 1966 and 1967. The disease is caused by *Ephelis oryzae*. The diseased plants are conspicuous by their malformed inflorescence bearing grayish white fructifications of the fungus. In the infected panicles, the spikelets are found to be glued to one another and to the main rachis by the viscid spore masses, which harden into a crust. Black sclerotial fungal masses are formed on mature panicles. The inflorescence of the healthy plant is a loose panicle measuring 30 to 40 cm long where as in the diseased plant, the spikelets become glued into a cylindrical structure and the length of the panicle gets reduced to 15-23 cm long.

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