

## Millet Rice Grows in wide Range of Environments and Productive

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### Abstract

Common millet rice served with curries is very tasty indeed, and so is the porridge prepared from common millet 'rice'. Common millet 'biryani' is a delicacy. Hoppers, string hoppers which are common Sri Lankan foods and all kinds of local sweet meats can be prepared from common millet flour. Some of the millets are better balanced food than rice, by virtue of their higher protein, fat and mineral contents.

**Keywords:** Plant hoppers; Green leafhopper; Harvested rice; Field planting; Relative humidity; Rice fields

### Introduction

Millets are sometimes used as poultry feed. Millets straw is usually relished by cattle when it is green and tender. Foxtail millet grains are sometimes used to feed pets such as parrots and other small birds that are kept in captivity. Finger millet seedlings are raised in nurseries. At the end of 25 days or so the seedlings are up rooted and transplanted at random with one plant per hill. Prior to transplanting the field is sown with the seeds of *Amaranthus* spp. Ten days after transplanting, the crop is dressed with 15 to 20 kg N/ha and this is followed with an irrigation. By this time, the *Amaranthus* is ready for harvest to be used as leafy vegetable [1]. A basin system of irrigation is followed and the source of water is open dug well. The period of finger millet cultivation is from May to August. In northern Sri Lanka several cropping patterns are followed both under rain fed and irrigated conditions. Cropping intensity is relatively high in this region compared to other areas in the dry zone. Farmers grow cash crops-onions, chillies, vegetables, potato, tobacco, cassava, etc. In some of the cropping patterns cash crops are followed by one or more millets, viz., finger millet, common millet or foxtail millet. In this region, the farm holdings are just around one fourth of a hectare and several cropping patterns are followed to utilize the farm resource and the available technology in the best possible way to maximise income. There is also an animal component in most of their farming systems [2].

### Discussion

A few head of cattle are usually maintained on these lands to enhance the soil fertility by supplying animal wastes such as cow dung, etc. These herds are shifted at short intervals within the holding to benefit the whole area alike. As the wet season commences a green manure crop such as sunnhemp is planted. At the time of flowering, this is ploughed in and the land is planted with potato or chillies which occupies the land from about four to seven months [3]. This is followed by vegetables, onions and often some millet. Incorporation of cattle manure and compost to the soil, in addition to the inorganic fertilizer is often practised in this intensive farming system. This practice improves moisture retention and the fertility of the soil. It is with this intention that a green manure crop is often included in the cropping pattern. Under the river diversion projects in the southern, south-eastern parts of Sri Lanka and in the north central province; high cash value crops such as chillies, pulses, maize, soybean and vegetables are grown and millets do not generally find a place in these cropping patterns. The cropping system in Sri Lanka is determined by the availability of water for crop production. Accordingly, there are rain fed and irrigated cropping systems and a third category, a combination of both [4]. The source of water for irrigation is from river diversion projects, reservoirs,

and underground water from open dug or tube wells. Millets are cultivated in the highlands under rain fed conditions in the southern, south eastern parts of Sri Lanka and in the north central province; agro-ecologically these areas come under the dry zone, where the average annual rainfall received is from 1270-1900 mm. Likewise, millets are cultivated in parts of north western, central and Uva provinces, and these areas fall under the intermediate zone, where the average annual rainfall is 1900-3175 mm. In the dry zone a major rainy season occurs during the period September to January and a minor one in April to July. Finger millet and foxtail millet are grown during the major rainy season under the shifting forest fallow system. The size of the holding per farming family is about one ha. The shrub jungle is burnt and the seed is broadcast sown. The soil is harrowed to cover the seed. The farmer does not use any fertilizers or practise any pest or disease control measures. Incidence of pests and diseases are rather low. Not only millets, a mixture of millets and cereals such as maize, sorghum, and vegetables are often grown under this system. Growth duration of millets is about four months [5]. The ear heads are collected as they mature in two or three harvests. Yield obtained ranges from 800-1000kg/ha. In the minor rainy season common millet is cultivated following the same shifting forest fallow system. Rainfall received during the season is about 200 mm and not very dependable. The seed is broadcast sown and buried in soil by light harrowing. In order to facilitate the emergence of seedlings from the tiny seed, the plough layer should be finely harrowed. In semi-arid regions, soil moisture is the main restricting factor in the spring. The major techniques for keeping the soil moisture are deep ploughing to enhance see page of autumn rain, soil compression in the winter and surface soil harrowing in the early spring. This important practice is the result of experience of farmers of Shanxi Province. Non-ploughing of the fields for summer seeding is necessary to avail an early seeding date [6]. The choice of a proper seeding date is based on soil moisture and the growth durations of the varieties planted. In the past, say 30 years ago, the seeding dates began in April, but now they are generally delayed up to May. Tools for sowing vary with different cultural backgrounds. Drill sowing machines

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are widely used. Some new sowing techniques have been developed in Northeast China where traditionally wide row spacing is practised. One of the techniques is to sow seeds on the ridges in a wide strip or in 2-3 narrow strips. Hole seeding was developed for selected seeds to reduce the seed rate. Generally, 11 to 15 kg seeds per hectare are required. Seed placing depth is between 3 and 5 cm and, surface soil compression is needed after seeding. Thinning of seedlings is necessary as relatively large quantities of seeds are sown [7]. Thinning is usually done about 20 days after emergence when seedlings have 4 to 5 leaves. Hand thinning is very slow and only 100-200 m<sup>2</sup> can be done per day. Seedlings are thinned leaving mounds of 3-5 plants spaced at 15 to 20 cm, or single plants in rows. Simplification of thinning method is one of the most important problems that researchers are working with. In the past, it was commonly accepted that low density would produce large ears. But when higher yield is required, higher density is beneficial, so adequate increase in planting density has been encouraged. The critical stage for applying fertilizer and water is from differentiation to micro-sporogenesis. Foxtail millet has been grown in China for thousands of years. The technical aspects of production are well known to Chinese farmers and in the past 30 years, new technology has been introduced into agricultural production. Replacement of traditional cultivation methods can only succeed when proven economic effects are significant. The following are some of the main improved management practices in the production of foxtail millet in China. In China, foxtail millet is distributed in temperate and cool regions, where one crop in a year, 3 crops in two years and two crops in a year are possible. In order to increase the multiple crop indexes, summer millet was popularized during the past 20 years. Of the total millet-growing area the share of spring millet is 85 per cent and summer millet is 15 per cent. Spring millet is usually grown after corn, sorghum, soybean or spring wheat; while summer millet is grown after winter wheat, barley [8]. Repeated cropping of fox tail millet will cause decrease in yield. Therefore one crop of foxtail millet at an interval of three years has proven to be beneficial. Intercropping is not very popular but when adopted, millet occupies at least 2/3 of the area in the field to ensure sufficient light for the millet growth. In the cultivation of millets, the damage or crop losses due to pests and diseases are generally low. One of the reasons for the low incidence of pests and diseases is the type of cultivation practised. In the shifting forest fallow system farmers pay less attention in growing this crop. Burning of the shrub jungle prior to the cultivation helps to get rid of the insect pests and the disease pathogens. Sporadic cultivation does not favour the multiplication and carry-over of the pests and diseases. After the cultivation of millets in the shifting forest fallow system, the land lays fallow and the chances of survival of the insect pest or the disease pathogen is less. Adherence to basic agronomic practices often helps to prevent or decrease the severity of the damage caused. Pests Millets grown in the wet season, namely finger millet and foxtail millet sometimes suffer damage caused by leaf eating caterpillars and grasshoppers. Army worms *Spodoptera maritima* feed on leaf and at times cut the seedlings at the base. Extent of defoliation caused by this pest depends on the severity of infestation. Both nymphs and adults of grass-hoppers feed on leaves. They also damage the ear heads. Dusting with gamma BHC 10 per cent D at the rate of 20 kg/ha or carbaryl WSP at the rate of 2.0 kg/ha controls the pest effectively. Stem border damage to the crop occurs occasionally and the losses are not appreciable. Presence of the pest is identified by appearance of dead heart at the vegetative growth stage and the chaffy ear head with near erect fingers at their productive growth stage. Incidence of this pest has been observed both in the wet and dry season. Application of a systemic insecticide provides adequate control. Presence of aphids has been observed in finger millet. Sometimes the infestation is very high and

the plant parts affected are ear heads, culms and the base of the culm near the soil surface. This can be considered as one of the major pests of finger millet. Aphid damage is observed both on the wet and dry season crop. Higher relative humidity and overcast skies are favourable environmental conditions for their multiplication. Affected plant at times becomes stunted. Ear heads damaged by aphids produce poor quality grains. Some species of ladybird beetle and other insects have been found feeding on aphids. This pest is controlled by the timely application of a systemic insecticide. Bird damage is often observed on foxtail millet at the time of maturity [9]. Damage to growing seedlings by wild rabbits is also observed when finger millet is cultivated near shrub-lands. Diseases Blast and helminthosporium fungal diseases are often seen on finger millet and foxtail millet, in the wet season when favourable environmental conditions prevail. Careful agronomic practices help to minimise their incidence. Seed treatment, plant spacing and regulating the amount of nitrogenous fertilizer applied to the crop are important measures to minimize the occurrence of these diseases. Smut disease is seen on the ear heads of common millet and this can be controlled by treating the seed with copper fungicide. Millets form an item of supplementary food and is a poor man's crop. The grain is ground to flourlike rice or wheat and tasty preparations such as porridge, pittu, string hoppers and roti are made. Prawns and sometimes vegetables and rice is added to the porridge. While making roti and pittu, coconut scrapings are added to the millet flour. Millet flour is mixed with wheat flour and used for making cake. Diabetic patients sometimes eat finger millet preparations instead of rice [10].

## Conclusion

In areas with staggered planting patterns, the short-duration varieties may be damaged because the brown plant-hoppers population is continuously high. Therefore, their use should be integrated with such other control measures as simultaneous planting. Little experimental work has been carried out on cultural control of the brown plant-hoppers.

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## Conflict of Interest

None

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