

Ethno taxonomical classification of little millet (*Panicum sumatrance*) by the tribal people in Tamilnadu, India

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ABSTRACT

This paper discusses about the adaptation of local cultivars of little millet in Kolli hills tribal areas in Tamil Nadu. Kolli hills of Namakkal district is in the tail Eastern ghats in Southern India with 14 clusters of villages consisting 263 hamlets. Existing tribal farming systems have been developed over many years of trial and error. These practices which may appear at first sight to be irrational, might actually be a necessary adaptation to local conditions. Kolli hills is known for traditional cultivation of Samai (Little millet), Thinai (Italian millet), Varagu (Kodo millet) and Panivaragu (Proso millet). Land races of these crop species are distributed all over the landscape. Depending upon their local agro-climatic conditions and land types, each village or zone cultivates one or two short and one late maturing varieties of little millet. Land races / populations are highly heterogeneous in terms of morphological and agronomical characters. Farmers of Kolli hills use para-taxonomic keys to differentiate between races of each species. This traditional wisdom has been discussed in this paper, which includes local cultivars of little millet viz., Sadansamai, Kattavettisamai, Thirikulasamai, Malliasamai, Perumsamai, Vellaperumsamai, Kottapattisamai etc.

Key words : Ethno taxonomy, Little millets, Kolli hills, Malayali tribal people, Southern India

Introduction

The world total millet production is shared by south and east Asia (about 60%), Eurasia and Central Asia (14%), Africa (16%) and rest of the world (10%). India is the leading producer of millets contributing about 38% of the world's production. Finger millet constitutes about 81% of the minor millets produced in India and rest by kodo millet, foxtail millet and little millet. However, the area and production trends during last several years indicate their con-

tinuous decline. Other major producers of these millets, in addition to India are China, Ethiopia, Niger, Nigeria and former USSR which together contribute 70% of the world population. In south Asia, Nepal, Pakistan and Myanmar are other important minor millet producing countries. Almost all millets in south Asia are used as food with very little used as feed.

Biodiversity and indigenous knowledge are inter-related phenomena (Warren, 1993). Once the diversity of floral and faunal resources disappears, the

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knowledge associated with these resources also disappears. Though the on-site communities with extensive knowledge of local environments, indigenous and local communities are most directly involved in conservation and suitable use of their resources, their rigid social structure with lesser social mobility had kept them away from scientific and technological progress. This had made the tribals to depend on indigenous technologies/ practices existing in their location and known to them from their ancestors. However today, such dependence on various plant genetic resources and the knowledge acquired over years of association with these resources is on the brink of total disappearance. With this in view, a study was conducted at the Kolli Hills in South India. The Kolli Hills located in the Namakkal District, Tamil Nadu, South India (78° 17' 05" E to 78° 27' 45" E and 11° 55' 05" N to 11° 21' 10" N) are a low ranging hills spread over an area of 441 sq.km. It is inhabited by a group of tribals known as the Malaiyalis. The Kolli Hills range between 1000 to 1300 m in height and cover an area of approximately 280 km². These hills are with a tenuous ecosystem situated at the southern edge of Deccan plateau, as part of the Eastern Ghats. The terrain is steep, soil is shallow and less fertile, mean annual rainfall is 1043 mm distributed more or less equally in two monsoon seasons. This allows only one crop during rainy season. The local hill community called *Malaiyalis* is very poor in economy. Most families own less than half-hectare land, which is far insufficient to eke out a livelihood from farming alone. Centuries of continued use has led to a rich repository of traditional knowledge associated with the cultivation and consumptive use of millets. Some of the traditional practices like mixed cropping, relay cropping, crop rotation and crop sequencing are likely to be useful in raising crops under uncertain weather and climatic condition. They have uncertain employment and income as farm labourers outside the hills.

The Malaiyalis cultivate 21 landraces of millets (Table 1) under different land categories (Table 2) and agro-ecologies. Kolli Hills is known for traditional cultivation of Samai (Little millet), Thinai (Italian millet), Varagu (Kodo millet) and Panivaragu (Proso millet). For many years, minor millet farming done on these hills is the source of their staple food grain. They have more than 34 land races of four millets namely, finger millet, little millet, foxtail millet and proso millet, grown at subsis-

tence level as a crop mixture. The diversion of minor millet area for an industrial crop has substantially reduced the community access to food and loss of varieties though they had been conserving for many years.

In Kolli hills, depending upon their local agro-climatic conditions and land types, each village or zone cultivates one or two short and late maturing varieties of little millet. Land races/population is highly heterogeneous in terms of morphological and agronomical characters. The study was conducted to identify, differentiate the races of little millet and characterize those using folk biological tools and morphological parameters. Farmers of Kolli hills use morphological parameters and para-taxonomical keys to differentiate between races of each species of little millet.

Methodology

The study was conducted in Kolli hills of Namakkal district. During the study, 140 aged and experienced farmers, ten from each clusters of villages were personally contacted for collecting Indigenous Tribal Agricultural Practices, through informal interview following proportionate random sampling technique from 14 clusters of villages (Alathurnadu, Bailnadu, Chithurnadu, Edappulinadu, Gundandinadu, Peraikkarinadu, Thirupulinadu, Ariyurnadu, Devanurnadu, Gundurnadu, Selurnadu, Thinnanurnadu, Valappurnadu and Valavanthinadu). The villages from the cluster were selected based on the criteria of maximum area under cultivation of little millets. Seven local land races of little millet (*Panicum sumatrance*) were subjected to Ethno taxonomical classification in 14 clusters of villages called Nadu based on the landraces availability.

Results and Discussion

The study was conducted with due attention to little millet among the four species of minor millets. Wide difference was observed in the morphological characteristics among various land races of little millet. So few attempts were made to systematically characterize and identify the various varieties. This study was conducted to identify, differentiate the races of little millet and characterize those using folk biological tools and morphological parameters

(Table.3). Farmers of Kolli Hills use para-taxonomical keys to differentiate between races of each species. It was quite interesting to note that way through which farmers identified and explained different races of a crop. The identified /selected respondent gave clues to identify the differences between various land races of little millet. Similar type of anthropological, archaeological, botanical, and historical literature survey was conducted in two species of fox-tail millet (Austin 2006). Likewise the landrace classification of small millets correlating with traits (morphological, agricultural, and cultural utility) associated with considerable factors such as yield, drought tolerance, growing season, medicinal properties, and nutrition was depicted by Newmaster *et al.*, 2013.

Sadansamai

- Sadansamai is an annual tufted grass species with slender culms, 90-120 cm high at harvest depending upon the soil fertility, narrow leaves with soft margin, 45-60 cm long and 8-10 cm broad, panicle loose drooping with primary and secondary branches, spikelets 4-4.5 mm, long, glabrous, flattened, caryopsis glabrous light brown colour in grains.

- It is an early maturing race (100-120 days) cultivated as a mono crop in terraced field. It is less profuse in tillering and pink colour pigmentation is present at the base of the second or third intermodal area.
- Sadansamai is cultivated at fairly high altitude ranging from 1200-1400m above mean sea level.
- It needs cool climate as compared to other landraces. Since the tertiary branches of the earhead resemble the plait of a bride, this millet is commonly known as Sadan (Sadai = plait of a bride) samai.
- Even a pig, when enters the cropped field (during the later stages of the crop) it will not be able to find its way out from the dense mesh.

Kattavettisamai

- An annual erect grass species with thicker culms, 150-180 cm high at the harvest depending upon the soil fertility, narrow leaves with serrated margin, 75-90 cm long and 8-10 cm broad, panicle loose drooping primary and secondary branches spikelets 5-5.5 mm, long, glabrous, flattened, caryopsis glabrous light brown colour in grains.
- Kattavettisamai is a late maturing variety usu-

Table 1. Landraces of millets in the Kolli hills

Common name	Binomial	Vernacular name	Land races of millets
Little millet	<i>Panicum sumatrance</i>	<i>Samai</i>	<i>Sadansamai, Thirikulasamai, Karumsamai, Kettavettisamai, Kottapattisamai, Malliyasamai, Perumsamai, Vellaperumsamai, Elansamai,</i>
Italian millet	<i>Setaria italica</i>	<i>Thinai</i>	<i>Senthinai, Palanthinai, Karunthinai, Perunthinai, Killanthinai, Koranthinai, Mosakkannathinai, Mokkanathinai</i>
Common Millet	<i>Panicum miliaceum</i>	<i>Panivaragu</i>	<i>Panivaragu</i>
Kodo millet	<i>Paspalum scrobiculatum</i>	<i>Varagu</i>	<i>Peruvaragu, Thirivaragu, Karunkalivaragu, Senkalivaragu</i>

Table 2. Land categories in Kolli hills

Local name	Land type	Major crops/ land use
Vayal	Low land	Paddy
Ulavukadu/Mettankadu	Upland	Mixed Cropping, monocropping millets, large scale tapioca and pine apple yard, home gardens, estate crops
Kollakadu	Rocky undulating Terrain	Millets as mono crops
Kirai	Pasture land	Tapioca pasture

ally, cultivated in a rocky terrain or kollakadu under bush fallow system. In case of excessive vegetative growth due to good soil fertility and favorable climatic conditions, farmers cut the crop above the unopened panicle during tillering phase mainly to induce and early maturity of the spikelets and to arrest the further vegetative growth that will enable the early harvest of the crop.

- The tillers of Kattavettisamai are very thick as that of the early tillers of sugarcane. The thick tillers are referred to as Kattai (Wood in tamil) and while harvesting they use sickle of a bigger size locally called as vetti (cut). The combination of these two terms makes this name.

Thirukulasamai

- An annual erect grass species with thinner culms, 90-100 cm high at harvest depending upon the soil fertility, narrow leaves with soft margin 45-60 cm long and 6-7 cm broad, panicle loose drooping primary and secondary branches, spikelets 5- 5.5 mm long, glabrous, flattened, caryopsis glabrous dark brown colour in grains.
- It is tolerant to drought and high temperature than other races.
- Thirukulasamai can be raised as monocrop or as a mixed crop with perumsamai.
- The secondary branches in the panicles are arranged in a twisted manner like a thin rope- thiri

implies twisted and kula implies the short stature of the crop and thus it is called Thirukulasamai.

Malliasamai

- An annual erect grass species with very slender tillers, 80-100 cm high at harvest, narrow leaves with soft margin, 35-50 cm long and 3-6 cm broad, panicle loose drooping primary and secondary branches, spikelets 4- 4.5 mm long, glabrous, flattened, caryopsis glabrous dark brown colour in grains.
- It is mostly raised as an early crop using summer showers before the main agricultural sowing season (June – July) in the terraced fields.
- It is early maturing low tillering race mostly cultivated as a monocrop in the terraced field and also as a mixed crop with perum samai.
- The reason for cultivating this particular race is that it enables the farmers to harvest grains during the off season agriculture. According to the people, the grains of Malliasamai are white in colour and soft in texture. Because of its colour (like the jasmine flowers which are called Malli) and texture the farmer call it so.

Perumsamai

- An annual erect grass species with thicker culms 160-190 cm high at harvest depending upon the soil fertility, narrow leaves with serrated margin

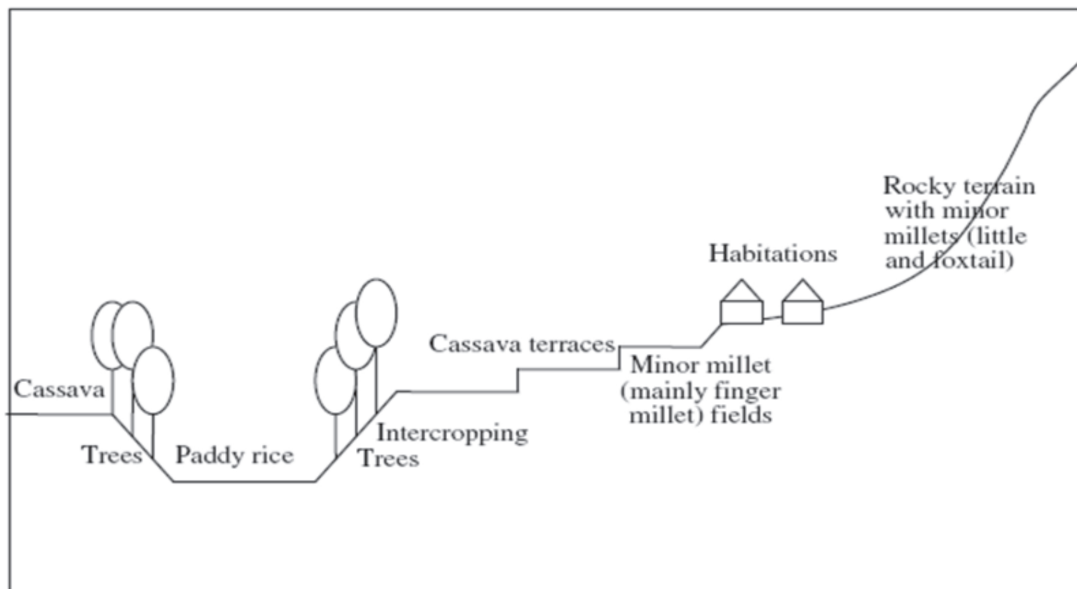


Fig. 1. Land type wise categorization of ITAPs

75-90 cm high and 8-10 cm broad, panicle loose drooping primary and secondary branches, spikelets 5- 5.5 mm long, glabrous, flattened, caryopsis glabrous dark brown colour in grains.

- It is late maturing race and cultivated in the high hillocks (Kollakadu) and in some places in the terraced fields in the crop mixtures i.e., in finger millet-based mixed cropping systems.
- Perum refers to the tall height of the crop as well as the lengthy period of its cultivation.
- Due to its dense growth and the sharpness of its leaf blades harvesting is a problem.
- The sharpness causes small skin irritations to those, who are harvesting it. This is sited as one of the reasons for its less preference to cultivate it.

Vellaperumsamai

- An annual erect grass species with thicker culms 170-190 cm high at harvest depending upon the soil fertility, narrow leaves with serrated margin, 85-90 cm height and 8-10 cm broad, panicle loose, drooping primary and secondary branches, spikelets 5- 5.5 mm long, glabrous, flattened, caryopsis glabrous light brown colour in grains.
- Vellaperumsamai resembles the Perumsamai in

its growth.

- The only difference is in the colour of caryopsis, which is whitish brown (vellai in tamil denotes colour of white) in colour whereas the latter is dark brown.
- Some of the women and men farmers said these races are one and the same.
- According to them, the difference in the colour of caryopsis is only due to type of the soil and agro-climatic conditions.

Kottapattisamai

- An annual erect grass species with thicker culms, 150-160 cm high at harvest depending upon the soil fertility, narrow leaves with serrated margin, 75-80 cm height and 7-8 cm broad, panicle loose drooping primary and secondary branches, spikelets 5- 5.5 mm long, glabrous, flattened, caryopsis glabrous dark brown colour in grains.
- It is a late maturing variety and prone to lodging problems particularly during the periods of heavy winds. Because of this character, its cultivation is almost reduced and only in few remote places it is still cultivated in the smaller scale where the problem of wind is less.

Earheads of Indigenous Little Millets



Fig. 2.

Table 3. Ecological and Morphological Characteristics of little millet

Characters	Little millet landraces						
	Malliasamai	Sadansamai	Thirukulasamai	Kottapattisamai	Vellaperumsamai	Perumsamai	Kattavettisamai
Ecology	Grows well in terraced field	Grows well in terraced field	Grows well in terraced field	Grows well in rock terrain	Grows well in rock terrain	Grows well in rock terrain	Grows well in rock terrain
Season	April-July	June- September	May- August	June – January	June – January	June – January	June – January
Duration	Short duration	Short duration	Short duration	Long duration	Long duration	Long duration	Long duration
Growth habit	Short, erect, thin stem with smooth leaf surface and edges	Short, erect, thin stem with smooth leaf surface and edges	Short, erect, thin stem with smooth leaf surface and edges	Tall, erect, compact, thick stem with hard leaf texture and serrated margins	Tall, erect, compact, thick stem with hard leaf texture and serrated margins	Tall, erect, compact, thin stem with hard leaf texture and serrated margins	Tall, erect, compact, thin stem with hard leaf texture and serrated margins
Stem colour	Pink streaks at the base of the stem	Pink streaks at the base of the stem	Regular green colour without streaks	Dark green colour without streaks	Dark green colour with pink streaks at the base of the stem	Dark green colour with pink streaks at the base of the stem	Regular green colour without streaks
Lodging	Tolerant loose panicle shape	Tolerant loose drooping	Tolerant loose drooping	Susceptible semi drooping	Tolerant compact	Tolerant compact	Susceptible semi compact
Thresholdability	Very good	Good	Good	Better	Better	Better	Good
Glume colour	Green with pink streaks	Green	Green with pink streaks	Green	Green	Green	Green
Grain/ seed colour	Dark grey brown	Grey brown	Dark brown	Light grey brown	Whitish brown	Whitish brown	Dark brown
Grain lusture	Bright	Bright	Bright	Shy,dull	Bright	Bright	Shy,dull
Grain shape and surface	Ovoid, smooth	Ovoid, round, smooth	Ovoid, smooth	Round to elliptical smooth	Ovoid, smooth	Ovoid, smooth	Ovoid, flat, smooth
Grain uniformity and plumpiness	Uniform and plumpy	Uniform and plumpy	Uniform and plumpy	Uniform and flat	Uniform and plumpy	Uniform and plumpy	Uniform and flat

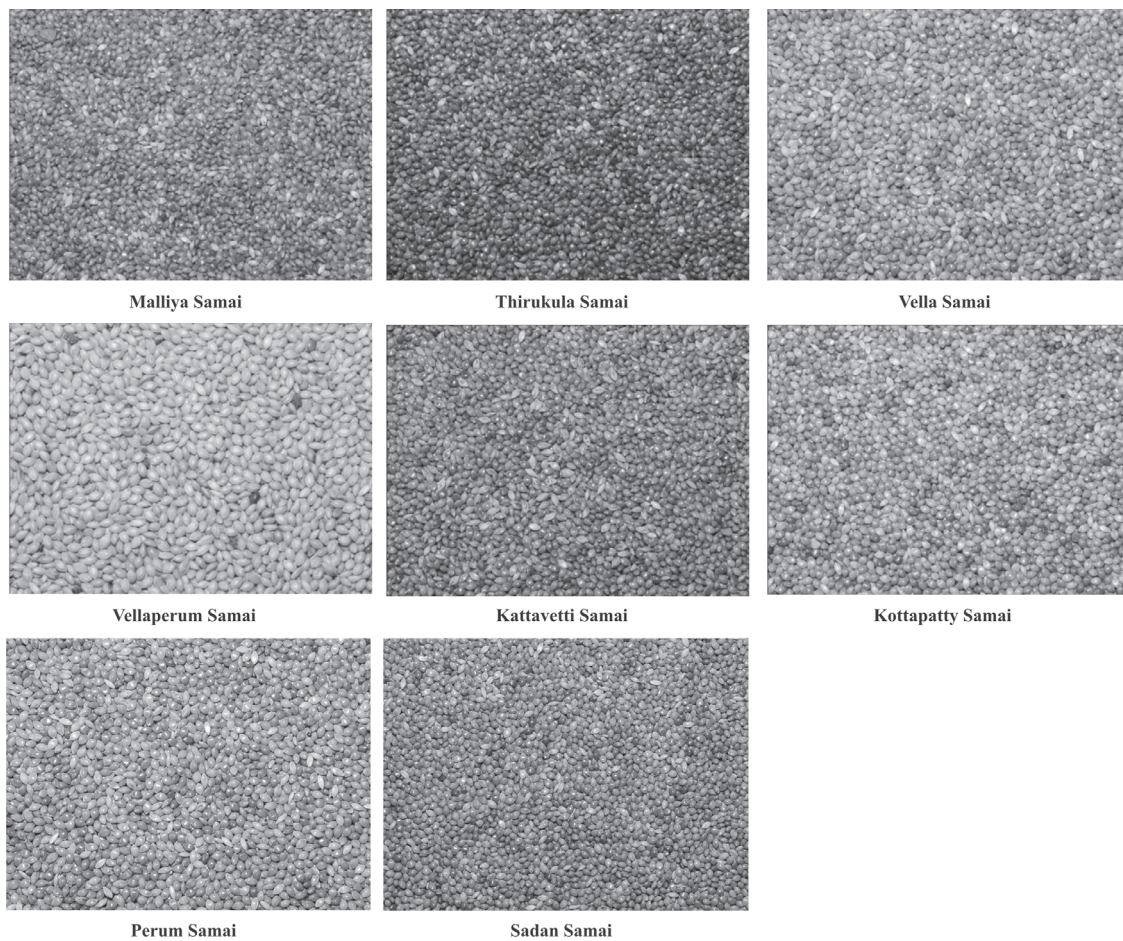


Fig. 3. Seeds of Indigenous Little Millets

Conclusion

The Ethno taxonomical classification revealed that morphological cues such as height, earhead structure and arrangement, agronomical and gastro-nomic qualities. Similar study on caryopses was documented by De Wet in 2000 on American millet. Malliasamai, the name implies the gastronomic quality, i.e., meal appearance, Sadansamai and Thirukulasamai represents the arrangement of grains in secondary and tertiary panicles, Elansamai represents the texture of the stem, Kattavettisamai denotes short plant with difficulty in harvesting process, Kottapattisamai represents higher productivity, Perumsamai reflects the size of the plant and duration of the crop. Further subdivision such as Vellaperumsamai and Karumperumsamai denotes the colour of the seed/ grain. These indigenous varieties of little millet have been found adapted to the

Kolli hills over centuries and found to be drought tolerant and pest and disease resistant in character apart from yielding substantially, as that of finger millets by Muthuvan tribes of Idukki district of Kerala (Johncy *et al.*, 2007). Hence, if these indigenous little millets are conserved and propagated for use among the farming community, they would definitely lead to endogenous development of food security thereby providing a basis for self-sufficiency nutritional security and self-determination of the common rural clientele.

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