Indigenous Paddy Varieties and Traditional Knowledge

Mathugama Seneviruwan

Introduction

The paddy plant, belonging to the genus *Oryza* has evolved through thousands of years and has many species. Out of them, two species, viz., *oryza sativa* and *oryza glaberima* are being cultivated. All varieties cultivated in Asia, Europe and America belong to the species *oryza sativa,* while varieties of the species *oryza glaberima* are being cultivated in West Africa. The *oryza sativa* has 3 sub-species or eco-geographic races, viz., *Japonica, Indica* and *Javanica*. The *Indica* varieties are being cultivated mainly in South East Asia, while the *Japonica* varieties are confined to countries, such as, Japan, Italy and Spain which are in the temperate zones. The *Javanica* is an intermediate variety between *Japonica* and *Indica and* is mainly cultivated in Indonesia.

In Sri Lanka, *Indica* varieties had been cultivated throughout its history, and according to folklore, there had been about 3000 traditional paddy varieties in use among the farmers. Those different varieties were cultivated to suit different climatic zones and seasons, soil conditions, water supply and drainage levels, etc. These varieties were identified by their traditional names. The Plant Genetic Resources Centre at Gannoruwa has catalogued a list of 2442 traditional paddy varieties, all of which belong to the *Indica* sub-species.

Buddhist literature is rich with many stories which refer to various traditional paddy varieties and their respective nutritional and medicinal properties. "*Poojawaliya*" and "*Saddharmalankaraya*" are two famous Buddhist texts that describe the merits of alms offered with rice prepared from such traditional paddy varieties.[1]

Agriculture Department of Sri Lanka (then Ceylon) issued its first hybrid paddy variety; "H4" to farmers of Sri Lanka in 1959. The "H4" was a cross between an indigenous variety called "*murungakayan*" and an Indonesian native variety called "*Maas*". With the increased use of "H4" and other subsequent hybrid paddy varieties, the cultivation of traditional paddy varieties gradually diminished. The efforts of the agronomists focused towards producing high-yielding hybrid paddy varieties, to contribute towards increasing the local food production. However, for those high-yielding varieties, the use of high volumes of chemical fertiliser too became essential. It was not so with the traditional paddy varieties and the farmers knew by instinct that the use of chemical fertiliser was sometimes even harmful. But, since the target was to increase the paddy production through the increased use of chemical fertiliser on hybrid paddy varieties, the cultivation of traditional paddy varieties were discouraged by all agriculture extension programs. Under these circumstances, all traditional paddy varieties disappeared from the paddy fields.

Several attempts have been made to conserve the vanishing paddy varieties in the 1950s and 1960s. The details of these attempts have been published in the "*Govikam*" journal published by the Department of Agriculture. In 1949, Mr. C F Wijekulasuriya, a former superintendent of the Mathugama Estate held an exhibition of around 500 such varieties in Kalutara. Prior to this, then Government Agent Mr. Nugawela has described the experiences of cultivating these varieties in the Kandy district. He has written an account of these varieties with a catalogue of 300 varieties, to the Journal of the Tropical Agriculturalist in 1902.

Geographical Distribution of Traditional Paddy Varieties

Among the traditional paddy varieties, those cultivated in well-drained and comparatively higher lands such as "Chena" were of special significance. In the traditional paddy culture, these lands were known as "*El Chena*" (අටු ඉඩම) and were conferred a special place. In the cultivation of "*El Chena*", the land is cleared at the outset, by cutting the scrub and jungle. When sufficiently dried, they are set on fire. Paddy was broadcast on this land at the start of the month of "*Bak*" (April), before the dawn of the "New Year" which falls on 13th of April. Paddy farming in "*El Chenas*" had been extensively practised in the districts of Sabaragamuwa. In the central hills of the country, such farming had been known as high land cultivation and in the low lands, such farming had been known as "*Polael Chena*". There had been specialised "*El Wee*" varieties cultivated in these areas.

Next to "*El Wee*", the most popular varieties were known as "*Maa Wee*".

They were cultivated only during the *Maha* (major) season. The reason was that "Maa Wee" varieties were photoperiod sensitive, i.e. for panicle initiation and flowering, it was important that the daytime is shorter and the night time is longer. The traditional farmers of the country who were aware of this requirement adjusted their cultivation times to ensure that the flowering of "*Maa Wee*" varieties would commence between 21st and 30th of December which coincides with the shortest daytime of the country.

The rivers that flow from the central hills overflow annually and form alluvial plains in the low lands. The "*Maa Wee*" cultivation was most popular in these areas. During the monsoon periods, the rivers that overflow bring organic materials and humus particles to low lands thus enriching the soil. The "*Maa Wee*" cultivated in these lands grow with strong root systems and healthy tillers. The "*Maa Wee*" cultivation had been widespread in the districts of Ratnapura, Kalutara, Galle, Gampaha and Matara. In addition, it is reported that "*Maa Wee*" was cultivated in the areas of Digamadulla and Trincomalee also.

The *Yala* (minor) season in the South-West zone of the country coincides with the South-West monsoon rains. South-West monsoon begins in May and last till September. Frequent floods are common during this period. Therefore, farmers cultivated their traditional paddy varieties before the "New Year Festivities" which were held on 13-14 of April. The paddy seeds sown during the first two weeks of April would be sufficiently tall to withstand the floods that come from May onwards. The plants start flowering by 21st June which happens to be the longest daytime in Sri Lanka. The farmers in the Kalutara district, in some parts of Ratnapura and Galle districts and in the general South West zone up to Kurunegala were engaged in this rather risky cultivation during the *Yala* season. The traditional paddy varieties thus cultivated in the *Yala* season included "*Deweddiri*" and "*Yal Samba*".

Short-aged varieties cultivated both in *Yala* and *Maha* seasons had been popular throughout the island. Among the short-aged varieties were many sub-varieties of 3-3 ½ months duration. According to the topography of the island, the reddish brown earth soils are found in the North-Central plains and in the southern-most plains in the South (Ruhuna). Most of the large and small irrigation tanks (*Wewa*) are also situated in these areas. Many traditional short-aged paddy varieties were cultivated in these areas to suit the respective special soil conditions. The traditional know-how of the paddy cultivation was passed down from one generation to the next.

The red-yellow soils in the South-Western plains contain alluvial sediments that make them rich in nitrogen. Other than that, the laterite (kabok) soils and loam soils in Matale were also used in the paddy cultivation. Additionally, sand mixed soils in the upper reaches of the "*Yaya*" (stretch of paddy fields) are also found. The traditional paddy varieties have evolved themselves to suit these different soil and climatic conditions. The preferred method of plant establishment was broadcast sowing rather than seeding in rows or transplanting. The farmers were careful to select the variety that is most suited to the soil types and climatic conditions. For example, "*Rathkara*" and "*Veli Handiram*" were used for the sandy soils. Special mention should be made about paddy farming in dried up tank beds ("*Wew Thavulu*"), during the dry season. "*Thavulu*" land was allocated among the farmers on a quota basis. The widely-used varieties were "*Tavulu Heenati*" and "*Muppangan*". These were short-aged crops, but nutritional values were high. The *Muppangan* variety was sown during the dry season, and when the tanks fill up with subsequent rains, the plants are capable of growing up with tillers and remain above water levels. It yielded a good harvest too.

Cultivation Methods of Traditional Paddy Varieties

Traditional paddy varieties were cultivated targeting the *Maha* and *Yala* seasons. The *Yala* season gets water from the South-West monsoon rains which begin with the end of April. Around 15th of March, the sun will be directly above Sri Lanka and the atmospheric temperature will be higher. The lands are prepared for paddy cultivation during this period. The uprooted weeds get dried up and the subsequent rains facilitate their biological degradation. Earth dykes ("*niyara*") around plots ("*liyadda*") are strengthened to contain and manage water and to prevent washouts during rains. Paddy seeds are broadcast either before or after germination. The system of seed broadcasting without pre-germination is known as the "*kekulan*" method. The "*kekulan*" method is used in dry land farming ("*Polael chena*"). Broadcast sowing is done between 7-35 days before the "New Year" both in the low – muddy land farming and in dry land farming.

The first rains ("*Thala wessa*") that come at the outset of the month of *Bak* (end March – early April) facilitate the germination of paddy seeds. The roots will develop in search of nutrients in the soil. The development of the root system and the tillers facilitate the plant's ability to stand erect in the face of wind and floods.

Heavy rains will commence after the New Year festival. The traditional belief was that rains will start after the "*Hisa Thel Gema*" (oil anointment ceremony). The root

system of the paddy plant further grows. Now and then, floods would bring and deposit valuable plant nutrients in the paddy lands. Growth of weeds was controlled by keeping the surface covered with water and due to prevention of sunlight by the canopy of the paddy plant. Application of additional fertiliser was not required.

Cultivation of short-aged varieties ("*Baala wee*") in the *Yala* season commenced in the month of May ("*Wesak*") and they also commenced flowering by 21-30 of June. Farmers believed that if the flowering occurred within two weeks from the "*Esala*" (June) full moon day, the "*kiri wedeema*" (grain filling of the spikelet) would either be incomplete or would not happen at all. That two week period was known as the "*Bol Esala*". The writer himself has done some experiments in this regard and is of the opinion that that belief contains some truth. So, the farming timetable should be adjusted so as to avoid flowering during this "*Bol Esala*" period.

Tillage operation for paddy plant establishment could be divided into three broad categories, i.e., wet land tillage, zero tillage and dry land tillage. In Sri Lanka, more than 85% of the paddy lands are cultivated using the wet land tillage. Tractors, buffaloes, cows or manual labour would be employed in the tilling operation. In traditional paddy farming, land preparation commenced between 15th of March and 13th of April which happened to be the "*Meena Ravi*" of the sun ("*Soorya*") calendar. Traditional belief also held the view that if land preparation work commenced during the following month, ("*Mesha Ravi*"), it would be harmful for the cows and buffaloes employed in the task.

The "*Maha*" (major) season which gets water from the North-East monsoon rain is the main paddy farming season for the country. The season starts with the cultivation of long-aged varieties (*Maa Wee*) during the months of July ("*Nikini*") and August ("*Binara*"). The farming practices were in full compliance with the environmental factors. Fertile alluvial plains in the river valleys were puddled with the help of the buffaloes. After about two weeks, plant establishment was done by broadcasting seeds. It was usually done on a day, and time declared to be auspicious by the astrologers and such day which would fall on the ascending period of the moon. Since the *Maa Wee* plant is of longer duration (6 months), careful preparation of the land is crucial. *Maa-Wee were not cultivated in sandy soils*, but sometimes they were cultivated in the dried up upper reaches of the tank beds (*Wev Thavulu*).

The proper *Maha* season commences in September. High-yielding varieties such as "*Hondarawalu*" were cultivated during this period. The traditional belief was that the plant establishment of "*Hondarawalu*" should be done before the arrival of the migratory bird "*Avichchiya*" (pitta brachyura /Indian pitta).

A fertile land was required for the paddy cultivation since no chemical fertilisers were applied on the surface after plant establishment. The ill-drained valleys where the natural water table is high and the irrigated lands were used for this. Weed control was normally done by water management, but sometimes manual weeding was also done.

The four-month varieties would be cultivated before the end of October ("*Wap*"). (Appendix). The cultivation of short-aged varieties commenced thereafter. The late-*Maha* varieties' ("*Maas passa*") were cultivated during November. Varieties with maturity durations of 90-110 days were included in this category. Land preparation for these short-aged varieties were done between 16th September and 16th October, and plant establishment was done before end November. It was believed that plants cultivated in December were prone to attacks from pests such as 'brown plant hopper' ("*Pela mekka*"). The only variety that resisted the 'brown plant hopper' attacks was "*Dhahanala*", which was cultivated in some tank-irrigated lands in the North-Central Province.

In traditional farming, the selection of auspicious times for the initiation of various tasks was considered as crucial. Most of the farmers themselves possessed the knowledge to select such auspicious times. If not, they sought the advice of the astrologers. The adherence to auspicious times in harvesting was also considered as critically important. The belief was that the yield would be greater if good auspicious times were followed in harvesting and threshing.

To improve the fertility of the paddy fields, the leaves of the plants such as *thespesia populnae* ("*Gansooriya*") were added to the soil before plant establishment. After harvesting and up to the commencement of tillage for the next season, herds of cows and buffaloes were allowed to graze in the paddy fields, either freely or while tethered. They prevented the excessive growth of weeds, while adding valuable organic manure to the soil in the forms of cow dung and urine, free of costs to the farmer. Those materials also hastened the decomposing of the other plant residues such as rice stubble and straws. Thus, the soils were replenished with nutrients to meet the requirements of the paddy plants of the next season.

Nutritional and Medicinal Values of the Traditional Paddy Varieties

Majority of the traditional paddy varieties of Sri Lanka contains a red pericarp. Even though there were a few "*samba*" varieties with a white pericarp, they were not cultivated as widely as those with red pericarp.

The main feature of these rice varieties were their medicinal values. In the Ayurvedic texts, different medicinal applications of these different rice varieties have been described. Accordingly, the indigenous doctors used these varieties in the preparation of many herbal medicines.

For medicinal purposes, the most widely-used rice variety was "*Heenati*". There were several sub-

varieties of *Heenati* and among them; the "*Black Heenati*" was considered the best. It was a short-aged (3 month) variety. For the treatment for snake poisoning, *Black Heenati* was boiled with water to prepare gruel and given to the patient. Traditional doctors added the juices of various floras to the gruel prepared with *Heenati* rice, to obtain different attributes and results.

In addition, for chronic diseases such as diabetes ("*Madhu Meha*"), gruel prepared with *Heenati* rice was invariably used as depicted in the following verse:

ලා කොහොඹිල සැම අරගෙන සොදිනේ
දිය හතරක් ලා එක සිඳ රැගෙනේ
හීනටි සාලෙන් කැඳ පිස දෙමිනේ
ජල වැඩි යාමක් නවතී මෙයිනේ

"*Mudamahana*" (මුඩමහන) was another herb with unique medicinal values in the indigenous medicine. In one such preparation, alternate layers of *Heenati* paddy and the leaves of the *Mudamahana* plant packed in a large clay pot were boiled together. Thereafter, the paddy is separated, dried and milled to obtain rice. Food prepared from such rice; cooked rice, *rotti* or *pittu*, were considered as a cure for diabetes.

There were many sub-varieties of *Heenati*, such as, Red *Heenati*, Black *Heenati*, White *Heenati*, *Gam Heenati*, Medicinal *Heenati*, and *Thavulu Heenati*. The red *Heenati* was used as a treatment for Hepatitis. Black *Heenati* was used as a cure for various ailments, particularly in the treatment of diarrhoea. *Thavulu Heenati* was considered for convalescing patients who had had problems in the digesting system. The Medicinal *Heenati* ("*Beheth Heenati*") had a maturity period of 3 ½ months and was best cultivated in the South –West zone of the island. It was also used in the treatment of snake bites. The White *Heenati* variety was also of 3 ½ month maturity and produced the highest yield among the *Heenati* sub varieties. The nutritional value of White *Heenati* was also considered as the highest.

If *Heenati* rice were not available, rice from *Dhahanala* or *Polael* varieties were substituted for the above treatments. "*Murungakayan*" was extensively recommended for expecting mothers. Its nutritional values were considered good for the growth of the foetus and useful for the mother at her confinement. "*Pachchaperumal*" was a three-month variety cultivated in the North-Central area. It was also considered as a very good controller of diabetes. All "*Maa Wee*" varieties were considered as very high in nutritional values, and fat content. The sub-varieties included "*Kuru Maa Wee*" (Dwarf variety), "*Baala Maa Vee*" (Short-aged variety) and "*Maha Maa Wee*", etc. Rice from *Maa Wee* was commonly used in orthopaedic treatments. Rice from *Maa Wee* was considered as a heavy diet which digests slowly. Rice obtained from the previous season's *Maa Wee* paddy was believed to contain higher nutritional values than the newer rice obtained from the most recent season's paddy. The red pericarp of the *Maa Wee* was used in the preparations of various indigenous medicines, as depicted in the following verse:

මාවී රතු කුරුවිට්ද කුරහන් පිටි ද ගෙන
විනාකිරෙන් අඹරනු එහි තරම දැන
පසුවේ තැල්මකදී ලේ ඉහිරවයි දැන
පැලැස්තරය දමමින් සුව කරනු මැන

"*Baala Maa Vee*" was a four-month variety and was popular in the Ratnapura district. Their rice was widely used in the treatments for gangrene and jaundice.

Among the sub–varieties of "*El Wee*", the most popular one was "*Suwandel*". In addition, "*Suwanda Samaba*" and "*Rath Suwandel*" were also popular. All those varieties were used in particular to make "Milk Rice". Such rice were sweet in taste and aroma and was believed to contain aphrodisiac properties and helpful in sweetening the voice.

Rice from all those "*El Wee*" varieties were comparatively easy to digest and contained high nutrients and therefore were prescribed for expecting mothers and infants. At the "*Indul Kata Gema*" (ceremony to mark the first rice meal of the babies), invariably rice from an "*El Wee*" variety was used.

All traditional paddy varieties were of medicinal value and rich in nutritional properties. Rice prepared by boiling the raw rice obtained from the most recent harvest were of particular value, as it was believed to improve the immune system of the body and prevent many ailments. A medical drink ("*Peyawa*") prepared from rice was used in the control of fever.

It was a tradition of the Sri Lankan villagers to consume gruel prepared from rice either without adding anything else ("*Lunu Kenda*") or with the addition of juices from various flora and coconut milk ("*Kola Kenda*") as breakfast. The use of rice from traditional paddy varieties for this purpose enhanced their nutritional values.

Footnote:

[1]According to the Buddhist literature which deals with the origin of the universe, the first-ever food of the mankind was clay and certain mushrooms that was as sweet and smooth as butter. Then, a paddy variety called "*Swayanjaatha Rath El*" self-appeared for the consumption of the mankind. The rice produced by that "*Swayanjaatha Rath El*" was delicious and readily consumable with no cooking or processing. All subsequent generations of paddy plants are considered to have descended from this "*Swayanjaatha Rath El*". In the Buddhist and other history texts, such as "*Maa Wee Uthpaththiya*", "*Goyam Kavi Maalaya*", written on Ola leaves, it has been mentioned that by the natural processes of adaptation, separation and cross pollination, "*Swayanjaatha Rath El*" has generated a large number of paddy varieties.

References:

1."ගොවිකම් සඟරාව- 1959",Department of Agriculture

2."සබරගමු පුරන් ගිය" – D H L Bandaranayake

3."ශ්‍රී ලංකා සඟරාව- 1961"

4."දුර්ලභ බතට වග" – Krishna Wijebandara

5.Plant Genetic Resources Catalogue – 1960, Passport Information Volume II

6."විස්තර වී ශිල්පය" – Mathugama Seneviruwan

7."හුළුවි-මහාවි-ලවි ගොවිතැන" – Mathugama Seneviruwan

Appendix

Traditional Paddy Varieties

Paddy Variety (1)	Maturity Period (months) (1)	Cultivation Season (1)	Cultivated Province/ District (2)	Soil Characteristics (3)	Yield (Bushel/ Acre) (4)	Medicinal values
Muthu Samba	7	Maha	Kalutara,Colombo,Gampaha	Red, Yellow & laterite	60-70	Aphrodisiac
Maha Maa Wee	-do-	-do-	Galle,Matara	-do-	-do-	Nutritional
Sudu Maa Wee	-do-	-do-	-do-	-do-	-do-	-do-
Kuru Maa Wee	6	-do-	-do-	-do-	-do-	Energizing
Muthu manikkan	-do-	-do-	-do-	-do-	-do-	Treatment in orthopaedics
Girisa Wee	-do-	-do-	-do-	-do-	-do-	
Rasna vaalu	-do-	-do-	-do-	-do-	-do-	
Dandu maara	4½, 5	Yala & Maha	Galle,Matara,Kalutara, Ratnapura	Red & Yellow soil, acidic boggy soil	60	Nutritional, improves immune system
Kaharamana	-do-	-do-	-do-	-do-	-do-	-do-
Nandu Horanavalu	-do-	-do-	-do-	-do-	-do-	-do-
Kahata Vee	4½	-do-	-do-	-do-	-do-	-do-
Sudu Vee	-do-	Yala	-do-	-do-	-do-	-do-
Mudali Vee	-do-	-do-	-do-	-do-	-do-	-do-
Galwaka	-do-	-do-	-do-	-do-	-do-	-do-
Sulai	-do-	-do-	-do-	-do-	-do-	-do-
Gonabaru	-do-	-do-	-do-	-do-	-do-	-do-
Ma Doluwa	-do-	-do-	-do-	-do-	-do-	-do-
Dewareddiri	04	-do-	-do-	-do-	-do-	-do-
Pihatu Vee	-do-	-do-	Ratnapura,Kalutara, Galle, Kandy,Trincomalee	-do-	-do-	-do-
Heen Handirin	-do-	-do-	-do-	Red-Brown soil	50-60	Nutritional, treatment for gangrene, jaundice,good for expecting mothers
Rath Handirin	-do-	-do-	-do-	-do-	-do-	-do-
Panniti Vee	-do-	-do-	-do-	-do-	-do-	-do-
Bollu	-do-	-do-	-do-	-do-	-do-	-do-
Aththa Vee	-do-	-do-	-do-	-do-	-do-	-do-
Bala Ma Vee	-do-	Maha	-do-	-do-	-do-	-do-
Hondarawala	-do-	-do-	-do-	-do-	-do-	-do-
Murungakayan	-do-	Yala & Maha	North Central Province	Red &Yellow latosol	-do-	-do-
Dikvee	4½	-do-	Galle,Matara	-do-	60-70	-do-
Veli handaran	3½	-do-	Kalutara,Galle	Red-Yellow, Red-Brown sandy soil	-do-	Good for expecting mothers
Kuru Hondarawala	-do-	Maha	Galle,Ratnapura	Red-Yellow podsol	-do-	
Mada El	-do-	-do-	Kalutara,Galle,Kandy	Red-Yellow, Red-Brown	50	Nutritional, energizing
Mada Thawalu	-do-	Yala & Maha	All Districts	All soils	60	
Muppan Gan	-do-	Yala	North Central Province	Red &Yellow latosol	-do-	
Kottiyaran	-do-	-do-	Trincomalee,Kalutara	-do-	80	
Kiri Naran	04	Yala & Maha	Ratnapura	Red-Yellow, Red-Brown	70	
Ilan Kayan	-do-	Maha	North,Kurunegala	-do-	-do-	
Perun Nalli	-do-	-do-	Jaffna	-do-	-do-	
Madei Karuppan	-do-	-do-	-do-	-do-	-do-	
Sudu Mala Wariyan	3½	Yala & Maha	-do-	-do-	-do-	
Rathu Kurumba	-do-	-do-	Matale	Red-Brown	-do-	
Kiri Kurumba	-do-	-do-	-do-	-do-	-do-	
Rath Mada El	-do-	-do-	Matale,Kandy	-do-	50-60	
Rath Kunda	-do-	-do-	Ratnapura,Badulla	Red-Yellow, Red-Brown	-do-	
Kalu Kunda	-do-	Yala & Maha	-do-	Red-YellowRed-Brown	-do-	
Kalu Kanda	-do-	Maha	Kalutara,Galle	Red -Yellow latosol	-do-	
Lumbini	3½	Yala & Maha	-do-	-do-	-do-	
Danduwel	04	Yala	Kalutara,Gampaha	-do-	60	
Rathu Vee	-do-	-do-	Kalutara	-do-	60-70	
Sudu Heenati	-do-	Yala & Maha	All Districts	-do-	-do-	
Rata Thawalu	3½	-do-	Galle, Ratnapura	-do-	50-60	Controls diabetes
Suramaniyam	-do-	Yala	Galle,Matara	-do-	60-70	Cure for snake bites
Kalu Heenati	3½-3	Yala & Maha	All Districts	All soil types	40-50	Good for expecting
Rathu Heenati	-do-	-do-	-do-	-do-	-do-	mothers, prescribed for
Podi Heenati	-do-	-do-	-do-	-do-	50	hepatitis, diarrhoea, first
Thawalu Heenati	03	Yala	North Central Province	Red -Yellow latosol	40	rice meal for babies
Dahanala	-do-	Yala & Maha	-do-	-do-	-do-	
Suwanda Samba	-do-	-do-	All Districts	All soil types	50	
Rathu Sooduru	-do-	-do-	-do-	-do-	40	
Kalu Bala Vee	-do-	-do-	-do-	-do-	-do-	Controls diabetes
Bata Polel	3½-3	-do-	Kalutara,Galle	Red-Yellow, Red-Brown	40-50	
Pachcha Perumal	03	-do-	North Central Province	Red -Yellow latosol	50-60	
Mookala Vee	-do-	-do-	Ratnapura,Badulla	Red-Yellow	50	
Rath Kara	3½-3	Yala	Kalutara,Galle	Red-Yellow sandy soil	-do-	
Kota Thawalu	-do-	-do-	-do-	Red-yellow acidic soil	-do-	
Ganthumba El	04	-do-	Ratnapura,Kalutara, Galle	Red-yellow podsol	80	
Kiribaru El	-do-	-do-	-do-	-do-	-do-	Nutritional, aphrodisiac
Batu El	-do-	-do-	-do-	-do-	-do-	sweetens the voice
Pinna El	-do-	-do-	-do-	-do-	-do-	
Nugapath El	-do-	-do-	-do-	-do-	-do-	
Suwandel	-do-	-do-	-do-	-do-	-do-	
Polael	-do-	-do-	-do-	-do-	-do-	

Sources:

1. Sri Lanka Magazine (1959-61), Information Department 2. Author's experiences 3. Maps of Sri Lanka
4. Author's experiences, (Dr. Amitha Benthota of the Paddy Research Institute, Bombuwela, has done a research on this subject)
5. Ayurvedic texts such as "*Wara Yoga Saaraya*", "*Charaka Sanhithawa*", "*Yoga Pitakaya*", "*Yogarnavaya*" and traditional experiences