Bio. Res. Today 2026, 8(1):10-13

Biotica Research Today

e-ISSN: 2582-6654

January, 2026

Article ID: RT1863

Popular Article

Phenotypic Characterization of Ramnad Mundu Chilli using IPGRI Descriptors

Gadha Sreekumar[1*], Thiruppathi M.[2], Manjusha M.R.[3], Gokulapriya T.[4] and Akhila Mathew[5]

[1]*Krishi Vigyan Kendra, Kumarakom, Kottayam, Kerala (686 563), India*

[2]*Don Bosco College of Agriculture, Arakkonam, Tamil Nadu (632 507), India*

[3]*College of Agriculture, Ambalavayal, Wayanad, Kerala (673 593), India*

[4]*Dept. of Horticulture and Plantation Crops, Tirunelveli, Tamil Nadu (627 007), India*

[5]*Dept. of Plant Breeding and Genetics, IIVR, Varanasi, Uttar Pradesh (221 305), India*

Open Access

Corresponding Author

Gadha Sreekumar

: gadharajee@gmail.com

Conflict of interests: The author has declared that no conflict of interest exists.

How to cite this article?

Sreekumar, G., Thiruppathi, M., Manjusha, M.R., *et al*., 2026. Phenotypic Characterization of Ramnad Mundu Chilli using IPGRI Descriptors. *Biotica Research Today* 8(1), 10-13.

Abstract

Chillies imparts flavour and spices to every meal that are unmatched by any other cuisine in the world. In addition to paying an essential role in Indian cuisine, chillies play a significant role in the Indian economy as a cash commodity. Due to the nutritional value and health advantages of chilli, there has been a constant demand as a commercial crop worldwide. A type of chilli, Mundu chilli to be distinctive among chilli types is renowned for its fiery, pungent flavour at Ramanathapuram district, a dry land of Tamil Nadu has achieved GI tag for its uniqueness. It has a great potential to augment the food system and demand in the future for foreign exchange earnings in India, due to its strong flavour, high antioxidant, capsaicin and oleoresin contents.

Keywords: Descriptors, Mundu chilli, Quality, Yield

Introduction

A tropical fruit with a strong flavour, Mundu chilli (*Capsicum annuum*) is a member of the *Solanaceae* family and is one of the valuable crop of Tamil Nadu, raised as a rainfed crop under the coastal saline dry belt of Ramanathapuram, Virudhunagar and Tuticorin districts (Sreekumar *et al.*, 2024). This Mundu Chilli type is cultivated in about 40,000 hectares in the above cited districts and the production touched about 80,000 tonnes in a season. It is well renowned for its acrid distinctive flavour and locally it is called as *"Gundumilagai"* in Tamil. It has tiny to medium-sized fruits/pods and the pods are round or oblong type having dark red colour at maturity. There is a range of variability in shape of Mundu Chilli *viz.*, Oozi, Chatti, Sathurai types (Sreekumar *et al.*, 2023a). This type of chilli is rich in carotenoids and phenolic compounds, which are utilised as natural pigments and antioxidants, as well as rich in capsaicin, which generates various levels of pungency.

One of the most extensively grown horticultural crops in the dry land Ramanathapuram district is Mundu chilli as rainfed crop. The "Mundu Chilli" has special qualities including the capacity to endure salinity and drought and it is mainly cultivated in dry environments in arid areas across Ramanathapuram (Sreekumar *et al.*, 2023b). Due to its origin in the Ramnad area of Tamil Nadu, India, this chilli is also referred to as the 'RamnadS9 Red Mundu Chilli'. It has a distinctive and powerful flavour when compared to other chilli types. They are seldom hot having characteristic flavour that brings out the flavours of many meals. The Department of Horticulture, Arippukottai, Tamil Nadu, documents that the "Mundu Chilli," also called Ramanathapuram Mundu, is the most recognised of the various types of chilli grown in the districts of Ramanathapuram and Tutukudi, with a cultivating area nearly of 14,998 hectares.

In 2023, for their unique flavour, physical and geographic features, Ramanathapuram Mundu chillies acquired the

Article History

RECEIVED on 07th January 2026 RECEIVED in revised form 15th January 2026 ACCEPTED in final form 16th January 2026

well-known Geographical Indicator Label (GI Tag). Farmers prioritized this Mundu type for rainfed areas, since it is in high demand in both domestic and international auctions and is sold at a higher rate than the Samba type Chilli. However, the chilli will be well acknowledged in the global market with the GI designation attached and the farmers will make considerably larger revenue.

Morphological Characters and Descriptions of Ramanathapuram Mundu Chilli Plants

The visible physical traits of plants are known as the morphological characters *viz.,* shape, size, structure and colour. In Ramnad mundu chillies, these characteristics help to differentiate them from other local or improved chilli types. They are vital for selection, identification, labelling and breeding purposes. Table 1 provides a portrayal of the morphological characteristics based on growth, adaptability and quality of mundu chilli plants. This is beneficial for improving crops and effectively cultivating mundu chilli.

Table 1: Morphological description of Ramanathapuram Mundu chilli plants

Sl. No.	Morphological Characters	Descriptions
1.	Plant habit	Semi-erect (dense growth)
2.	Anthocyanin colouration of nodes	Absent
3.	Plant height (cm)	65-78
4.	Stem pubescence	Absent
5.	Stem shape	Angled
6.	Leaf : length of blade (cm)	8.3-17.4
7.	Leaf : width of blade (cm)	4.6-6.2
8.	Leaf colour	Dark green
9.	Intensity of green colour	High
10.	Leaf shape	Ovate
11.	Leaf undulation of margin	Entire
12.	Leaf pubescence	Absent
13.	Flower : Petal colour	White
14.	Anther colour	White
15.	Days to 50% flowering	45-53 after transplanting
16.	Flower orientation	Drooping

The Ramanathapuram Mundu chilli has a semi-erect plant habit with dense foliage. This bushy growth form helps shield developing fruits from environmental stress, especially from excessive sunlight. The plants have a medium height ranging from 65 to 78 cm, where the nodes lack anthocyanin colour, which provides a key distinguishing feature as the plant has a uniform green stature. The stem is smooth and hairless, likely reducing pest attraction. Its angled shape provides enough support to carry the fruit's weight and lowers the risk of the stem breaking in plants.

The leaves are ovate and smooth at the edges, with the length and the width varying from 8.3 to 17.4 cm and 4.6 to 6.2 cm, respectively, providing a wide surface area settling for high photosynthetic activities. The leaves are dark green in colour, reflecting an increased quantity of chlorophyll, photosynthetic capacity and nutrient uptake, which are promising for plant growth, resulting in a higher crop yield.

The flowers of the Ramanathapuram Mundu chilli variety are white in color with white anthers, typical of Capsicum, reflecting normal flower development. The flowers hang down, which protects the reproductive organs from direct sunlight and rain, thus increasing the efficiency of pollination. This variety attains 50% flowering within 45 to 53 days after transplanting, reflecting early flowering, which is favorable for areas with short growing seasons.

Morphological Characterization of Ramanathapuram Mundu Chilli Fruits

Ramad Mundu chilli is popular due to its special flavour and the shape of the fruit, mainly its demand for use in cooking. The detailed description of the morphology of the fruits, as presented in Table 2, is vital for fruit variety identification, classification, registration, improvement of agricultural techniques and breeding for higher yields and quality production.

The Ramanathapuram Mundu chilli yields its fruits in hanging clusters, a standard characteristic feature in Capsicum species, which often helps to shield and protect the fruits from heavy rain and drastic sunlight. The fruiting habit is naturally solitary, with one fruit typically developing at an individual node, thereby diminishing the competition for nutrients and securing appropriate fruit growth and quality. At the stage where the fruit is mature but still unripe, it have a dark green colour, which signifies higher levels of chlorophyll and when they are physiologically mature, the colour turns to dark red (Figure 2). As the fruits mature, in the early stages, the fruit's weight ranges between 9.3 to 16.8 g and later lowers to approximately 5.3 to 12.4 g, due to water loss. The fruit length ranges from 2.3 to 2.8 cm during the earlier stage and when it reaches maturity, it drops slightly to 1.8 to 2.5 cm. Likewise, the fruit diameter also declines during the early development stages ranging from 2.4 to 3.5 cm and 2.1 to 2.9 cm in later mature stages.

The fruits are generally round, retaining a flat bottom and a round upper portion and they stay straight and symmetrical without having any curves during developmental stages. The basal portion of the fruit does not have a neck, which offers it a compact and smooth look (Figure 1). The pericarp has a little waviness, making the undulating surface gentle, while the prevalent fruit remains as smooth, which helps to lower the incidence of pests and diseases. The immature fruits gradually change their colour from green to orange, ultimately showing a deep red colour. When the fruit attains full ripeness, it develops a vibrant, rich red colour, which adds a beneficial element in the market linked demand to

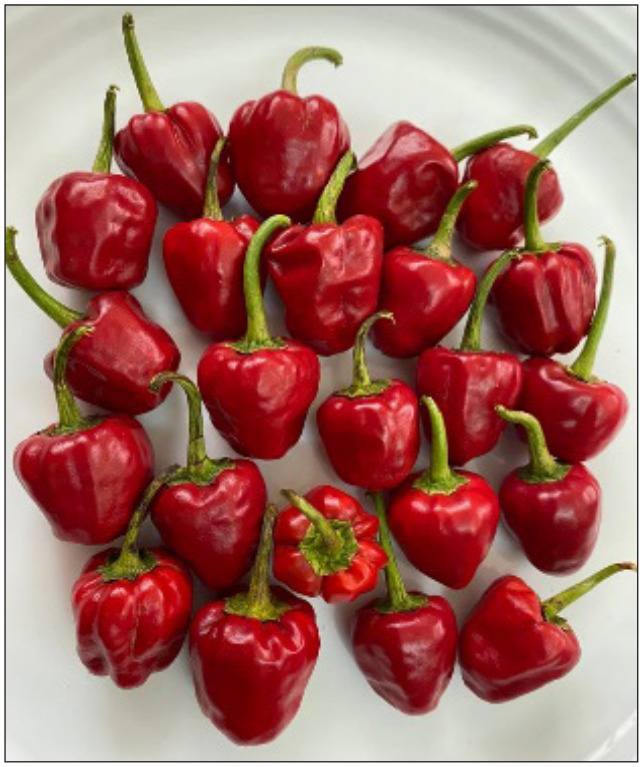

Figure 1: Ramnad Mundu chilli fruits

Figure 2: Ramnad Mundu chilli Plants

high carotenoid levels and huge attractive appearances. The strong red hue improves the crop's commercial value and underscores its unique flavour in cuisines.

The fruits contain golden yellow seeds at maturity enclosed in two to three locules, providing good seed viability and germination rate. At the early growth stages and after maturity, the stalk length ranges from 2.2 to 3.1 cm and 1.9 to 2.8 cm, respectively. The calyx is totally intact with its edges not overlapping each other, which makes fruit picking more manageable and easier; while the pedicel attachment is long-lasting and firm, which helps in reducing the chances of the fruit drop, resulting in lower fruit yield. A unique blossom-end appendage is present, acting as an extra varietal identifier. The pericarp thickness at maturity and after drying ranges from 0.67 to 0.70 mm in fresh fruits

Table 2: Morphological description and yield of Ramanathapuram Mundu chilli fruits

Sl. No.	Morphological characters	Description
1.	Fruit orientation	Drooping
2.	Fruit bearing habit	Solitary
3.	Fruit colour at mature unripe stage	Green
4.	Intensity of colour at mature unripe stage of fruit	Dark green
5.	Weight (g)	
	Initial growth stages	9.3-16.8
	Later growth stages	5.3-12.4
6.	Length (cm)	
	Initial growth stages	2.3-2.8
	Later growth stages	1.8-2.5
7.	Diameter (cm)	
	Initial growth stages	2.4-3.5
	Later growth stages	2.1-2.9
8.	Fruit curvature	Absent
9.	Fruit shape	Round (flat at bottom)
10.	Neck at basal end	Absent
11.	Sinuation of pericarp	Present
12.	Texture of surface	smooth
13.	Fruit colour (at ripening stage)	Dark red
14.	Fruit colour intensity	High
15.	Colour transition	Occurs in three stages (Green-orange-dark red)
16.	Shape at the base	Flatten
17.	Shape at apex	
	Initial growth stages	Blunt
	Later growth stages	Blunt
18.	Number of locules	2-3
19.	Stalk length (cm)	
	Initial growth stages	2.2-3.1
	Later growth stages	1.9-2.8
20.	Calyx cover	Non-overlapping
21.	Pericarp thickness (mm)	0.67
22.	Dried pericarp thickness (mm)	0.22-0.28
23.	Calyx margin	Entire
24.	Pedicel attachment	Strong (persistence)
25.	Blossom end appendage	Present
26.	Seed colour	Golden yellow
27.	Dry fruit yield hectare^{-1}	1.2-1.5 t ha^{-1}

and 0.22 to 0.28 mm, respectively. This outer thin layer of the mundu chilli facilitates sufficient drying and helps to accomplish the desired texture. The dry fruits yield from Ramanathapuram Mundu chilli changes between 1.2 to 1.5 tonnes hectare^{-1}, which offers an increased productivity of mundu chilli, particularly in rain-fed farming approaches.

Conclusion

Two significant commercial features of Indian chillies are recognised as its global fame is the colour and degree of pungency. In order to increase the area under this spice crop and harvest the benefit from commercial trade, superior quality seeds of Mundu Chilli, pest and disease resistance with high yielding cultivars and hybrids should be developed in future.

References

Sreekumar, G., Janavi, G.J., Nageswari, K., Venkatesan, K., Muthiah, C., Mohan, M.M., 2023a. Genetic variability studies in F_3 generation of mundu chilli (*Capsicum annuum* L.) for growth, yield and quality. *Electronic Journal of Plant Breeding* 14(4), 1538-1540.

Sreekumar, G., Janavi, G.J., Nageswari, K., Venkatesan, K., Muthiah, C., Madhan Mohan, M., 2023b. Correlation and path coefficient in F_3 generation Ramnad Mundu chilli (*Capsicum annuum* L.) for growth, yield and quality. *European Chemical Bulletin* 12(10), 13049-13057.

Sreekumar, G., Janavi, G.J., Venkatesan, K., Muthiah, C., Madhan Mohan, M., Rajangam, J., 2024. Correlation and path coefficient analysis of Mundu chilli for growth, yield and quality attributes. *Journal of Chemical Health Risks* 14(01), 784-793.