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Solanum lycopersicum var. *cerasiforme*: New distributional record of naturalized cherry tomato from Odisha, India

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ABSTRACT

The genus *Solanum* is one of the wide ranging, economically important and taxonomically challenging plant genera of flowering plants. Wide extent of genetic variability among and within the species, wild crop relatives and many heirloom cultivars make its identification much confusing. *S. lycopersicum* var. *cerasiforme*, a botanical variety and small fruited cherry tomato, is native to Mexico and Andes mountains in South America. While exploring germplasm collection of wild crop relatives in parts of Odisha, the occurrence of a naturalized taxonomic variety of cherry tomato *Solanum lycopersicum* var. *cerasiforme* was explored from tribal inhabited Kandhamal, Balangir and Kalahandi districts of Odisha. After critical review of published literature on distribution, its natural occurrence was found to be new report for the flora of Odisha and represent a new distributional record for Eastern and Central India. The present report deals with its taxonomic description, habitat/ecology, germplasm collected and conserved and field photographs for easy identification and further economic utilization.

Key words: Cherry tomato, Eastern and Central India, germplasm, new plant record

INTRODUCTION

Solanum is the largest genus in the family *Solanaceae* and one of the world's wide-ranging plant genera of flowering plants with approximately 1500 species (Frodin, 2004; Vorontsova et al., 2013). The members are cosmopolitan in distribution and found almost in all temperate and tropical continents (Weese and Bohs, 2007). Wide extent of genetic variability among and within the species and infra-specific categories, wild crop relatives along with many local landraces and heirloom cultivars make its identification much confusing. In India, the genus *Solanum* is represented by 49 species distributed throughout the country, of which 17 species occur in the Eastern Ghats region (Venkatappa, 2011). Several major crops of vegetable crops such as potato (*Solanum tuberosum*), tomato (*S. lycopersicum*) and eggplant (*S. melongena*) along with many medicinal plants and ornamentals belong to the family Solanaceae.

The exact native range of *S. lycopersicum* is obscure, because of its long history of cultivation. However, it is considered to be native to parts of South America viz. Peru and Ecuador (de Candolle, 1886) or parts of Central America and Mexico (Jenkins, 1948). *S. lycopersicum* var. *cerasiforme* (Dunal) DM Spooner, GJ Anderson RK Jansen, a rounded and small fruited tasty and tomato (cherry tomato), is regarded as a botanical variety and thought to be the probable ancestor of cultivated tomato. It is said to be the intermediate genetic admixture between wild currant type and domesticated tomatoes (Nesbitt and Tanksley, 2002). This wild tomato is still native to Mexico and along the Andes mountain range in South America and it is described as highly invasive and widely naturalized along waterways, riparian areas, forest edges in many parts of Australia, Pacific islands, New Zealand, Queensland, New South Wales, South Asian countries including India. Further, the

cherry tomato became popular as cash crop in some Asian countries. *S. lycopersicum* var. *cerasiforme,* one of two promising wild types of *Solanum* offers great potential for selection of parental material in breeding programmes and their broad geographical range (Medina and Lobo, 2001).

During the course of exploration mission for germplasm collection in parts of Odisha in 2014 and 2025, the first author observed the occurrence of naturalized cherry tomato, an interesting wild relative and botanical variety of *Solanum lycopersicum,* in the Eastern Ghats Zone from Kandhamal, Balangir and Kalahandi districts of Odisha (Fig. 1). The seed germplasm bearing respective accession numbers were collected from the field and deposited in the National Gene Bank, NBPGR, New Delhi for long term storage. Further, the seeds were multiplied, and live plants were maintained in the field gene bank of the ICAR-NBPGR Base Centre, Cuttack for morphological characterization. The plant specimens bearing both vegetative and flowering parts were deposited in the herbarium of NBPGR base center, Cuttack, Odisha along with one set at the National Herbarium of Cultivated Plants (NHCP), NBPGR New Delhi. The live plants and the herbarium specimens were critically studied, and the morphological features of the plant were examined using the trinocular lens and dissection microscope and the distinct taxonomic characters were described. The photographs of plants in the natural habitat along with flowering and fruiting stages and seeds were taken for easy identification (Fig. 1-2).

On critical examination of the vegetative and floral characters of live plants coupled with study on herbarium specimens, the species was identified as *Solanum lycopersicum* var. *cerasiforme* (Dunal) DM Spooner, GJ Anderson and RK Jansen., a plant species which has not been reported till date from the state. On verification of major published Indian literature, there is no authentic record of natural distribution of this variety from Eastern and Central India including Odisha (Prain, 1903; Haines, 1922; Gamble, 1923; Matthew, 1982; Deb, 1983; Nair and Henry, 1983; Guhabakshi, 1984; Mukherjee, 1984; Sanyal 1994; Saxena and Brahmam, 1995; Mudgal et al., 1997; Pullaiah and Ali Moulali, 1997; Singh et al., 2001). Thus, the present collection counts an addition of botanical variety to the flora of Odisha and forms a new distributional record for the flora of Eastern and Central India. A detailed taxonomic description on morphology of plant species along with photographs (Fig. 1-2); the habitat and ecology are provided to facilitate its easy identification and economic exploitation.

TAXONOMIC DESCRIPTION

An annual unarmed climbing herb. Stem sticky-pubescent, terete, apical part hirsute to tomentose, branched, up to 1.5 m long when found on a support/ground: trichomes of two types, the longer sparse and shorter dense, glandular. Leaves simple, alternate, often in unequal pairs, interrupted imparipinnate, ovate to lanceolate, distantly serrate to dentate, acute to thinly acuminate; primary leaflets sub-opposite or alternate, 1.5-4.0 × 0.5-1.5 cm, ovate, cuneate, base sometimes with oblique base, irregularly lobed, terminal leaflet usually larger than the laterals, secondary leaflets less than 6, lyrate, short-petiolate, rachis 2-15 cm, puberulous above and thinly pubescent especially on nerves beneath, dark green; petiole 3-10 mm, hairy. Flowers yellow in peduncled cymes, peduncle once or rarely 2-branched, 5-7 flowered, 1-2.5 cm; rachis pubescent with glandular trichomes, pedicels 7-12 mm, hairy, articulated in lower half. Calyx lobes 5, linear to lanceolate, apex acute, up to 1 cm, densely pubescent, spreading on fruit, tube less than 0.5 mm. Corolla bright yellow, rotate, 1-2 cm across; lobes lanceolate, acute, ciliate, 0.7-1.2 × 0.2-0.5 cm, reflexed at anthesis, tube minute. Stamens 5, exerted, anthers connivent in a cone, opens by slits. Ovary 2-celled, conical, glandular-villous, style usually exerted from the staminal column, stigma obtuse. Berry rounded to spherical, 1.5-2.5 cm diameter, becoming bright red at maturity, pulpy juicy, 2-celled, calyx lobes accrescent in fruit, strongly reflexed. Seeds many, compressed, beaked, 2.5- 3.0 mm across, testa appearing hairy on surface.

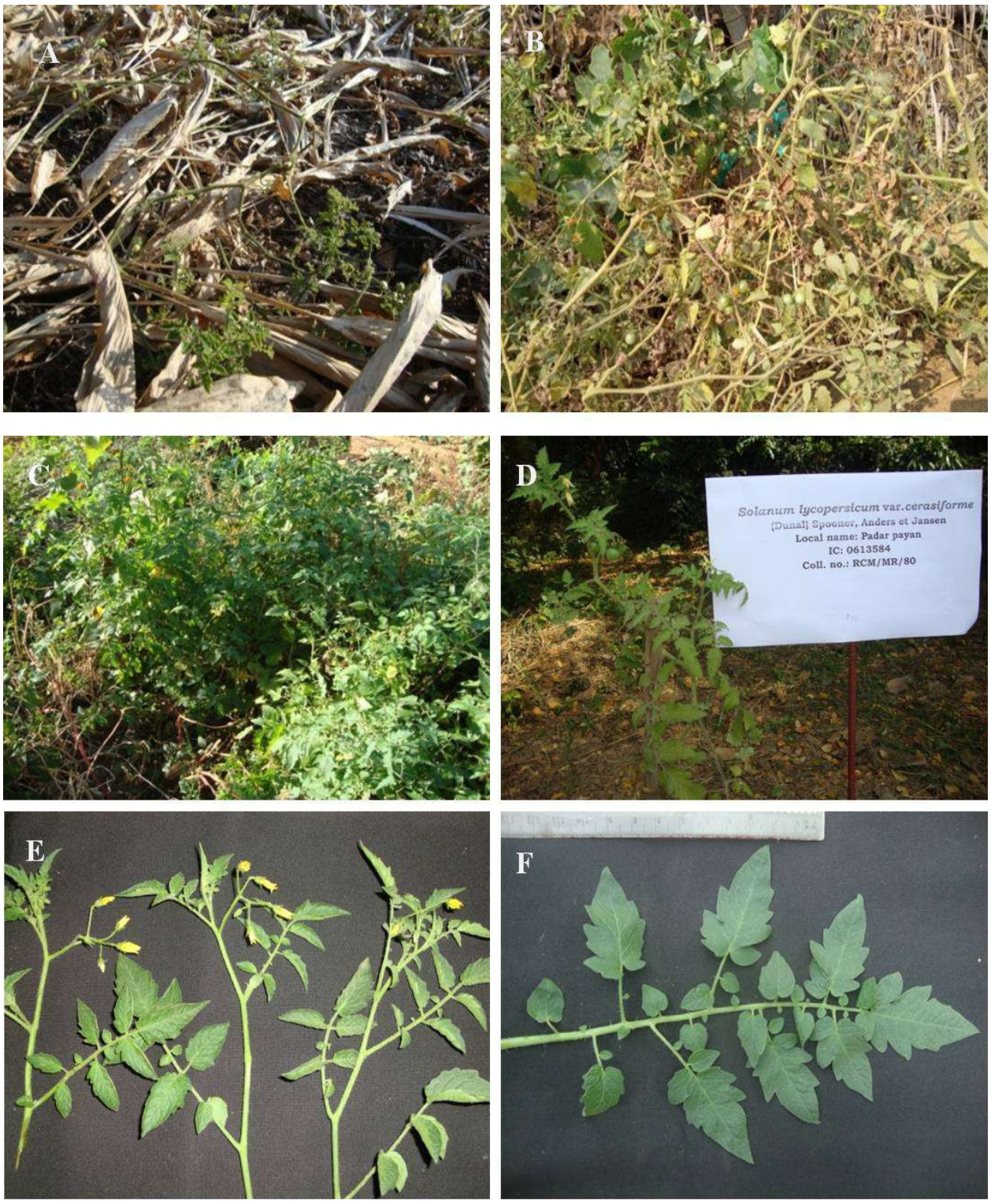

Fig. 1. *Solanum lycopersicum* var. *cerasiforme*. A-C: Natural occurrence in Kandhamal, Balangir and Kalahandi districts; D: Maintained in Field Gene Bank, Cuttack; E: Flowering branches; F: Leaves

Fig. 2. *Solanum lycopersicum* var. *cerasiforme.* A: Flowers and tender fruits; B: Ripe fruits; C: L.S. of fruits shows 2-celled; D: Seeds; E: Herbarium preserved; F: Tribal man collects fruits in Kandhamal district; G: Fruits collection for consumption by a woman in Balangir district

Taxonomic note

Solanum. lycopersicum var. *cerasiforme* mainly differs from garden tomato cultivars (*S. lycopersicum* var. *lycopersicum*) in its smaller size of fruits having diameter 1.5- 2.5 cm and 2-celled ovary/fruit, whereas the garden tomato has a fruit diameter of 3 cm or larger and many-celled. High range of genetic diversity is found in the wild relatives of tomato, which show a great variability for fruit quality characters such as flavor, aroma, colour and texture as well as high vitamin 'C' content, high antioxidant such as lycopene 10 mg per 100 g fresh weight (Miller and Tanksley, 1990; Nuez, 1999). Wild and feral cherry exhibit two allozyme diversity patterns: one similar to the allozyme diversity pattern exhibited by cultivated tomato and another one similar to the wild *S. pimpinellifolium* allozyme diversity pattern and hence the mosaic between *S. lycopersicum* and *S. pimpinellifolium* genomes due to frequent hybridization between two types (Rick and Forbes, 1975).

HABITAT/ ECOLOGY

The plant specimens were growing naturally in partly disturbed habitats on the wastelands and isolated fallow lands among the weeds interspersed with herbs and grasses, though they are occasionally found growing near habitation. The live specimens were recorded in three different landforms from Kandhamal, Balangir and Kalahandi districts in Eastern Ghats and western rolling uplands zones of Odisha. The plant prefers a tropical climate with open sunny areas and well-drained soil. The plants are readily propagated from seeds and sufficient seedlings were raised and further transplanted in the field gene bank of the center for morphological observation and record.

SPECIMENS EXAMINED AND GERMPLASM COLLECTED AND CONSERVED

i) Site 1: India, state: Odisha, district: Kandhamal, block: Khajuripada, nearby village: Betakhola, *R.C. Misra*, HS number 22963 (NHCP), 1512 and 1513 (Herbarium of ICAR-NBPGR Base Centre, Cuttack), dated 19.12.2014; seed germplasm acc. no. IC-613584 (collection no: RCM/MR/80); source: natural wild, disturbed, fallow land; frequency: rare; Local name: *Padarpayan*.

ii) Site 2: India, state: Odisha, district: Balangir, block: Loisinga, nearby village: Bhadra, *R.C. Misra,* dated 17.01.2025; seed germplasm accession no. RCM/MKM/25/22); source: natural wild, disturbed, roadside hedges; frequency: rare; Local name: *Chhota Patalghanta*.

iii) Site 3: India, state: Odisha, district: Kalahandi, block: Junagarh, nearby village: Bondoguda, *R.C. Misra,* dated 26.01.2025; seed germplasm accession no. RCM/MKM/25/125); source: natural wild, partly disturbed, roadside hedges; frequency: rare; Local name: *Khata Patalghanta*.

ETHNO-BOTANIC USES

The local people consume the ripe fruits as vegetables and also as chutney, pickle and salad mostly during the day meal.

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