

# On the Occurrence and Taxonomy of False Garlic - *Nothoscordum gracile* (Aiton) Stearn (Amaryllidaceae), an Invasive Weed in Peninsular India

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## ABSTRACT

*Nothoscordum gracile* (Aiton) Stearn known as 'False garlic', 'Bastard garlic' or 'False onion weed' belongs to the family Amaryllidaceae. It grows gregariously and resembles onion (*Allium cepa* L.) in cultivated fields. The present communication reports *Nothoscordum gracile*, an invasive weed, for the first time in Maharashtra, in Peninsular India.

**Key words:** *Allium*, Amaryllidaceae, False garlic, *Nothoscordum*, Peninsular India.

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## Introduction

Amaryllidaceae J.St.-Hil., a family of flowering plants includes about 1600 species belonging to 75 genera and most of the species are bulbous geophytes (Christenhusz & Byng, 2016). The family is economically important by contributing to ornamentals (e.g., *Crinum asiaticum* L.), vegetables (*Allium cepa*), spices (*Allium sativum* L.), and medicines (e.g. *Crinum malabaricum* Lekhak & S.R.Yadav), however, some species are opportunistically invasive weeds of cultivated fields, gardens and open areas. Some of the species of *Nothoscordum* Kunth are invasive weeds and may affect crop plants in various regions. The genus has its center of origin in New World and belongs to the tribe Leucocoryneae of the family Amaryllidaceae. Members of *Nothoscordum* are reported to be paraphyletic (Fay & Chase, 1996). *Nothoscordum* comprises about 89 species native to South and North America and spreading across Western Europe, North & South Africa and Australia (Plants of the World Online, 2021). Sharma (1985, 1994) first reported the genus *Nothoscordum* in India.

Pandey *et al.* (2015) reported *N. gracile* (Aiton) Stearn for the first time from northern and northeastern India as a weed and ornamental plant naturalized in experimental gardens and cultivated as an edible plant in kitchen gardens. Furthermore, they reported that

the species has the ability to invade cultivated fields and open areas along roadsides and gardens and it is very tricky to remove this species from the invaded area due to its gregarious perennation by numerous bulblets and seeds. *N. gracile* is similar to onion and garlic plants in general morphology and cannot be distinguished easily from the crops in the field.

During field exploration around Kolhapur, Maharashtra, specimens of onion- or garlic-like plants were collected along roadsides, from gardens and wastelands. After critical study, the specimens were identified as *N. gracile* a species so far not reported from peninsular India. The present communication aims to report the occurrence of the species in peninsular India and provides a detailed description, taxonomy, identification key and notes on *N. gracile*.

## Material and Methods

Plant specimens resembling genus *Allium* growing along roadsides, in gardens and in waste places around Kolhapur city and Ujlaiwadi (adjoining village) were collected during July-August 2021. These were studied and identified as *N. gracile* by using relevant literature (Ravenna, 1991, Stearn, 1986, Delucchi, 2009, Sassone *et al.* 2014 and Sassone *et al.* 2015, Pandey *et al.* 2015). Plants were photographed using Nikon D-7000 while

different plant parts were dissected and photographed under stereomicroscope (Labomed, CMZ 6). A key for distinguishing *Allium* from *Nothoscordum* was prepared as the two genera are closely related and difficult to distinguish based on general morphology. Specimens were processed as per methodology given by Jain & Rao (1977) and deposited at Shivaji University Herbarium (SUK!). Brief description with all important taxonomic citations, Type specimen, phenology, habitat, etymology, economic importance, taxonomic notes on the species are provided.

## Results and Discussion

### Diagnosis and generic delimitation:

*Nothoscordum* is separated from *Allium* by means of the following distinguishing key characters:

Inflorescence lateral, 1-many flowered, filaments usually dilated, ovary elongated, never depressed, style terminal ..... *Nothoscordum*

Inflorescence usually terminal, many flowered, filaments usually uniform except at base, ovary depressed at apex, style sub-gynobasic ..... *Allium*

*Nothoscordum gracile* (Aiton) Stearn. Taxon 35: 338. 1986; *Allium gracile* Aiton, Hortus Kewensis 1: 429. 1789; *Milla macrostemon* var. *gracilis* (Aiton) Baker, J. Linn. Soc., Bot. 11: 381. 1870. (Fig. 2)

**Type:** UNITED KINGDOM, Aiton 1788, BM000578828 (BM) (JSTOR image!)

Perennial, slender, bulbous geophyte, 20-90 cm in height; bulb solitary or 2-3 bulbs in cluster, 1-4 cm in diam, tunicate, tunica white-coloured, fleshy; each bulb with about 20-50 small fusiform bulblets. Leaves 5-35 × 0.4-1.3 cm in length, radical, linear-lanceolate, glabrous, glaucous, entire along margin, base ligulate, apex acute to mucronate. Scape 5-50 cm in length, lateral, cylindrical, 0.3-0.6 cm in diam., glabrous with thin striations. Inflorescence 5-15 flowered, unbranched umbels with membranous to scarious bracts at base; bracts 2, 0.8-1.5 × 0.4-0.8 cm, triangular, membranous, with longitudinal veins. Flowers 1-1.5 cm in diam, pedicellate; pedicel 4-7 mm long, sub-erect, glabrous; perianth lobes 6, 1 × 3-3.5 mm, oblanceolate, petaloid, white with pink or green tinge, slightly connate at base, glabrous; stamens 6, about 9 mm in length, filaments erect, 8 mm, dilating towards base attenuated towards apex, glabrous, connate; gynoecium *c.* 9 mm, erect, ovary oblong to elliptic *c.* 3.5 mm, tricarpeal, syncarpus with 8-12 ovules per locule, style 5-6 mm,

apical, erect glabrous; stigma simple papillae; nectary ring at base of ovary. Capsule *c.* 1 × 0.7 cm, obovate, 3-loculed, seeds 6-8 per locule; seeds *c.* 2 × 1 mm, broadly orbicular to comma shaped with distinct beak, testa reticulate.

**Habitat:** Grows as weed in open areas, along roadsides and in gardens grows at 546 m above mean sea level. Plants grow gregariously and produce tremendous bulblets inside the soil surface and forms compact structure in the field (Fig. 1).

**Flowering and fruiting:** Throughout the year.

**Etymology:** In Greek *nothos* = false and *skorodon* = garlic means a garlic-like plant without spicy odour to its bulb (Quattrocchi, 1999) and *Nothoscordum* = ‘bastard garlic’ means unusual hybrid of *Allium*, whereas *gracile* = slender or weak herbs (Gledhill, 2002).

### Distribution:

**Global:** The species is native to Argentina, Australia, Bolivia, Brazil, United States of America, Chile, Colombia, Costa Rica, Ecuador, Guatemala, Mexico, Panamá, Paraguay, Peru, Uruguay and invasively spreading over Algeria, Australia, Bermuda, California, Cyprus, Egypt, Florida, France, Georgia, Great Britain, Greece, India, Jamaica, Indonesia, Kenya, South Africa, Libya, Malawi, Mauritius, Morocco, New Zealand, Norfolk Is., Palestine, Portugal, Sicilia, Spain, St. Helena, Tanzania, Zimbabwe (POWO, 2021).

**India:** Arunachal Pradesh, Delhi, (Pandey, et al. 2015) Maharashtra (Present report), Nagaland, Punjab, Uttarakhand (Pandey, et al. 2015 and Sharma 1985 & 1994).

**Specimens examined:** INDIA, Maharashtra, Kolhapur Dist. Ujalaiwadi, along roadsides, 08 August 2021, 16.666867 N, 74.264127 E; Nilesh Madhav & Jagdish Dalavi JVD-2222 (SUK!); Kolhapur: Shastri Nagar, waste places 10 August 2021, 16.687840 N, 74.241908 E., 546 m above mean sea level. Jagdish Dalavi JVD-2223 (SUK!).

**Flowering period and spread:** Usually flowers start to open at 4 pm and produce a strong fragrance in the evening. The species produces capsules throughout the year and produces seeds and bulblets. Each bulb produces 20-50 bulblets which get detached from the mother plant and spread through soil translocation or plowing in farms. Each plant produces 1000-2000 seeds per year and 80-90 percent of the seeds easily germinate on maturity (Pandey et al. 2015).



Figure 1. Habitat of *Nothoscordum gracile* (Aiton) Stearn.

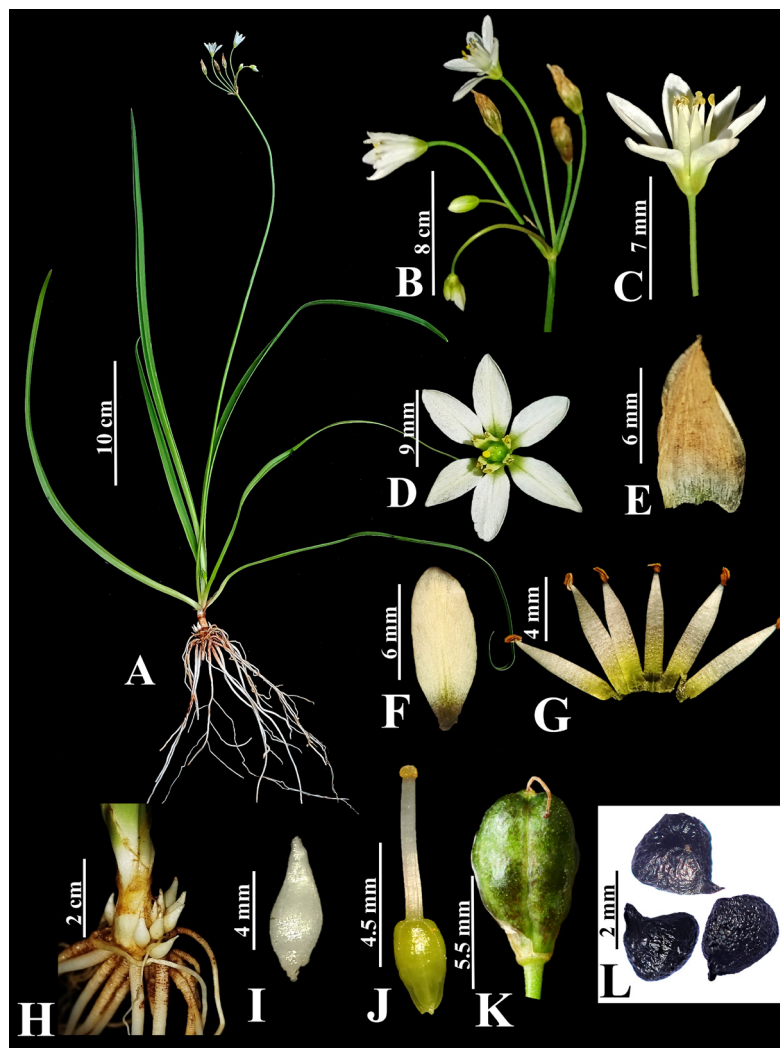


Figure 2. *Nothoscordum gracile* (Aiton) Stearn. (A) Habit. (B) Umbel. (C) Flower. (D) Top view of flower. (E) Inflorescence bract. (F) Perianth (G) Stamens. (H) Cluster of bulblets. (I) Single bulblet; (J)Gynoecium. (K) Fruit. (L)Seeds. (Photo credit: Jagdish Dalavi & S.R. Yadav)



**Taxonomic notes:** *Nothoscordum gracile* is very close to its allied hybrid *N. × borbonicum*; purported to be misapplied to *N. inodorum* (Aiton) G. Nicholson, but in fact *N. × borbonicum* is a natural hybrid produced from the widely distributed *N. gracile* and *N. entrerianum*, naturalized in gardens, parks and disturbed sites and shows many forms and hence it can be considered a form of *N. gracile* (Aedo, 2006; Delucchi, 2009). Pandey et al. (2015) mentioned the color of tunica as brown but observation on the present population shows the tunica color is white to cream-coloured, it may be due to climate and altitudinal changes or variation due to mutation.

**Weed Risk:** *Nothoscordum gracile* is highly invasive and difficult to control CALIPC (California Invasive Plant Council). The only method to control the weed is by digging the whole block of plant with soil, since uprooting the plant can cause dislocation of bulblets in soil and rapid multiplication and uncontrolled spread. Pandey et al. (2015) reported that it is difficult to recognize false garlic in onion fields. It is a hardy bulbous perennial with the potential to infest barren lands, waste places, and abandoned areas Groves et al. (2005). Hence, globally it is reported as a weed of roadsides, waste places, disturbed lands, landscaped areas, gardens, etc. requiring further study of ecology, spread and control measures.

**Use:** The bulbs are sometimes gathered from the wild and used as a substitute for garlic (Pandey et al. 2015). It is sometimes grown as ornamental (Huxley, 1992). Fragrant false garlic is a rich source of alkaloids, carbohydrates, flavonoids, glycosides, steroids and tannins, many elements which are useful in the treatment of many diseases (Sidhu & Thakur, 2016) apart from its edible value.

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