

## Species

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# A new geographic record of rare artillery fungus, *Sphaerobolus jaysukhianus* Vasava, Patel & Rajput, 2020, from Bhilwara District, Rajasthan, India

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## ABSTRACT

A novel occurrence of the fungal species *Sphaerobolus jaysukhianus* Vasava, Patel & Rajput, 2020 is documented in Rajpura village, Mandalgarh Tehsil, Bhilwara district, Rajasthan, India. The fungus was grown on a complex mulch substrate of cattle dung, dead twigs, and leaves on July 28, 2023. It is a new geographic record for this rare species. This finding contributes to the understanding of fungal diversity in Rajasthan and India.

**Keywords:** *Sphaerobolus jaysukhianus*, Artillery Fungus, New Geographic Record, Rajasthan, India

## 1. INTRODUCTION

Fungus of the *Sphaerobolus* genus, discovered by (Tode, 1790). It is an interesting, unique genus within the Sphaerobolaceae family. The species of this genus are renowned for their unique spore-dispersal mechanism (Buller, 1933). They are popularly called "artillery fungus", due to their ability to forcibly discharge their mature, adhesive spore packets, termed glebae, up to 1-6 meters away from the substrate on which they develop (Walker and Anderson, 1925). These remarkable feats result from built-up internal pressure and a slippery slime layer lining the gleba. When the pressure reaches a critical level, the slime ruptures, propelling the gleba through the air like a tiny projectile.

This explosive mechanism ensures efficient spore dispersal in nature, helping *Sphaerobolus* to colonize in the new territories (Kalayanamitra et al., 2023). Beyond its dramatic spore-launching, *Sphaerobolus* has a global distribution, found in the United States of America, India, Australia, Thailand, Africa and Europe (Buller, 1933; Walker and Anderson, 1925; Kalayanamitra et al., 2023; Ellis and Ellis, 1990; Vasava et al., 2020; Butler and Bisby, 1931; Aplin, 1961; Calonge, 1998). Five recognized species within the genus *Sphaerobolus* include *S. siowensis*, *S. ingoldii*, *S. cuprophilus*, *S.*

*stellatus*, and *S. jaysukhianus*. Notably, India is home to the latter two, with *S. stellatus* documented in 1931 by Butler and Bisby, (1931), and *S. jaysukhianus* added recently by (Vasava et al., 2020).

## 2. LOCATION AND ECOLOGY OF HABITAT

While conducting a biodiversity study on July 28, 2023, in the Rajpura village (N 25.380554, E 75.195668) of Mandalgarh Tehsil, Bhilwara District, Rajasthan, India, a fascinating fungus was spotted near the shoreline of a village pond (Figure 1). Though, occurrence of water is not perennial in the pond, still, owing to the rainy season, the pond was nearly overflowing. Thickets of *Prosopis juliflora* were present just outside the shoreline. A small hillock, making the catchment of the pond, is present towards the north-western side of the water body. Scattered small-sized trees of *Acacia leucophloea* were on the hillock (Figure 1). The fungus was present just outside the shoreline in the partial shade of *P. juliflora*. The fungus grew on a substrate made of dung, fallen twigs, and foliage pieces. We examined the specimen in detail, focusing on its morphological features. We took photographs and recorded the coordinates.



**Figure 1** Habitat where the fungus was spotted.

## 3. RESULT AND DISCUSSIONS

A detailed examination of the fungus revealed several vital morphological features. The size of the thallus was approximately 15 cm X 7 cm. presence of basidial chamber, glebae gregarious 3.0-3.7 mm in size. The lack of gammae aided in the identification of the specimen. During sample collection, glebae were observed to be silently discharged from the fungal fruiting body, forming blackish spots on the collector's white shirt. As many as four stages of *basidial chambers* were present at the time of observation as follows: Immature basidial chambers bulged with a sand-colored appearance.

Nearly mature, spherical, translucent, unexploded basidial chambers. Fully mature, opened, star-like, ready to shoot, with blackish gleba and yellowish liquid. The empty basidial chambers whose glebae have been shoot out. Initially, the empty chambers retain some yellow liquid. Over time, this liquid disappears, and the chambers become dry and whitish in colour. Because of the presence of different stages of basidial chambers, a mosaic appearance is visible in the thallus. Based on the morphological characteristics observed, we identified the fungus as *Sphaerobolus jaysukhianus* (Figure 2-4).





**Figure 2** The thallus of the fungus



**Figure 3** Opened basidiocarp with visible gleba



**Figure 4** Close-up view of an empty peridiolum from which spores have been discharged

#### 4. CONCLUSION

This study expands the known geographic distribution of *Sphaerobolus jaysukhianus* by reporting its presence in Bhilwara, Rajasthan, India. Our observations further our understanding of its ecological niche, suggesting a preference for heterogeneous, cattle dung-based substrates along the shorelines of seasonal ponds in scrubland environments.

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#### Author Contribution

Anil Sarsavan and Satish Kumar Sharma conceived the study design, conducted the literature review, analysed the data, wrote the manuscript, and approved the final version.

**Conflicts of interests:**

The authors declare that there are no conflicts of interests.

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**Ethical approval & declaration**

In this article, as per the fungal regulations in Foundation for Ecological Security, India, the authors observed the rare artillery fungus, *Sphaerobolus jaysukhianus* Vasava, Patel & Rajput, 2020, from Bhilwara District, Rajasthan, India. The fungal ethical guidelines are followed in the study for species observation, identification & experimentation. The ethical guidelines for plants & plant materials are also followed in the study.

**Data and materials availability**

All data associated with this study are present in the paper.

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