Bioscience Discovery, 17(2):187-190, April - 2026

Open Access, Peer Reviewed, Referred Research Journal

Print & Online available on https://jbsd.in
ISSN: 2229-3469 (Print); ISSN: 2231-024X (Online)

Review Article

First report of *Ampelomyces quisqualis* as a mycoparasite of powdery mildew on *Euphorbia tithymaloides* from India

Kavade S.S.[1] and Thite S.V[2]*

Department of Botany,
[1]Sangola Mahavidyalaya, Sangola Dist. Solapur (M.S.) India 413307
[2]Karmaveer Bhaurao Patil Mahavidyalaya, Pandharpur Dist. Solapur (M.S.) India 413304 (Empowered Autonomous)
*Email: sachinthiteg4@gmail.com

Article Info

Received: 14-02-2026,
Revised: 19-03-2026,
Accepted: 28-03-2026

Keywords:
Ampelomyces quisqualis, hyperparasite, powdery mildew, *Euphorbia tithymaloides*, biological control

Abstract

During a routine survey of ornamental plants in Pandharpur tehsil, powdery mildew disease was noticed on leaves of *Euphorbia tithymaloides*. The infected plants showed white powder-like fungal growth on both surfaces of the leaves. Astute microscopic examination of infected tissues revealed the presence of pycnidial structures of *Ampelomyces quisqualis* within the powdery mildew colonies. The hyperparasite caused gradual browning and collapse of the mildew mycelium. The occurrence of this mycoparasite on powdery mildew infecting *E.tithymaloides* has not been reported previously from India. Therefore, the present study represents the first record of *A. quisqualis* associated with powdery mildew on this ornamental host in India.

INTRODUCTION

Powdery mildew diseases are among the most widespread fungal diseases affecting ornamental, vegetable, medicinal, and agricultural crops worldwide (Yarwood 1957; Agrios 2005). These diseases are caused by obligate fungal pathogens belonging to the order Erysiphales and usually appear as white powdery fungal growth on leaves, stems, and young plant parts (Braun & Cook 2012). Severe infection often leads to reduction in photosynthetic activity, early leaf senescence, and poor plant growth.

E. tithymaloides is an important ornamental shrub cultivated in gardens due to its attractive zig-zag stem and decorative foliage. The plant is also recognized for its medicinal importance in traditional systems of medicine. However, fungal infections such as powdery mildew reduce its ornamental value and overall plant health.

Among the naturally occurring antagonists of powdery mildew fungi, *A. quisqualis* is considered one of the most effective mycoparasites (Kiss 2003). The fungus parasitizes hyphae and reproductive structures of powdery mildew pathogens, thereby suppressing their growth under natural conditions (Sundheim & Krekling 1982). Due to its biological control potential, *A. quisqualis* has gained considerable attention in sustainable disease management programs (Kiss et al. 2004).

Although several studies have documented the occurrence of *Ampelomyces* species on powdery mildew fungi infecting different hosts, information regarding its association with powdery mildew on *E. tithymaloides* from India is lacking. Therefore, the present investigation was undertaken to study and report this new host association.

MATERIALS AND METHODS:

Collection of Diseased Samples:

Leaves infected with powdery mildew were collected from ornamental gardens and roadside plantations in Pandharpur during 2025–2026. Infected samples showing white fungal colonies with brownish parasitized regions were carefully collected and transferred to the laboratory for further examination.

The infected leaves of hosts were deposited at Geobotany Herbarium of the Institute of Botany, Department of Geobotany and Botanical Garden, Martin Luther University, Halle, Germany with accession number (HAL-2934 F).

Microscopic Study:

Microscopic examinations of the infected samples were performed following standard mycological procedures. Small portions of the fungal growth were mounted in lactophenol cotton blue and observed under a light microscope for detailed morphological characterization. Observations included the nature of superficial mycelium, morphology of appressoria, conidiophores, conidia, and chasmothecia along with their dimensional measurements.

For detection of the mycoparasitic association, infected leaves bearing powdery mildew colonies were initially examined under a stereomicroscope. Brown to dark brown pycnidial structures developing within the powdery mildew mycelia were carefully isolated using a sterile needle under a dissecting microscope. The isolated pycnidia were mounted in lactophenol cotton blue and microscopically examined to study their morphology and internal structures.

Microphotographs of important fungal structures were captured using a compound light microscope equipped with an imaging system. Morphometric measurements were recorded using standard micrometry techniques. Identification of the powdery mildew fungus and its associated mycoparasite was carried out with the aid of established taxonomic descriptions and published literature, including the works of Paul and Thakur (2006), Braun and Cook (2012), Belsare et al. (1980), Hashioka and Nakai (1980), and Kiss (1998).

RESULTS AND DISCUSSION:

Powdery mildew infection appeared as white superficial fungal growth on leaves and tender shoots of *E. tithymaloides*. Initially, small powdery patches developed on the leaf surface, which later enlarged and covered major portions of the leaves. After microscopic examination of diseased samples revealed the presence of a fungus *Fibroidium* sp. In advanced stages, infected colonies turned brown and appeared collapsed due to hyperparasitic activity.

Microscopic observations revealed numerous pycnidia of *A. quisqualis* embedded within the powdery mildew mycelium. Pycnidia were dark brown to black, globose to pyriform, and measured approximately 65–115 µm in diameter. Pycnidiospores were hyaline, smooth-walled, unicellular, and ellipsoidal to cylindrical, measuring about 6–10 × 2–4 µm. These morphological characteristics closely corresponded with earlier descriptions of *A. quisqualis* reported by Kiss (2003) and Braun & Cook (2012).

Several earlier reports have documented the mycoparasitic association of *Ampelomyces* species with powdery mildew fungi infecting a broad range of host plants. These hyperparasites have been recorded on powdery mildews affecting grapevine (Legler et al. 2015), apple (Vaidya & Thakur 2005), agricultural crops, weeds, and medicinal plants (Kiss 1998). In India, occurrences of *Ampelomyces* as a hyperparasite have also been reported on powdery mildew infecting *Xanthium strumarium* (Gautam & Avasthi 2016a; Kumar & Chandel 2024), *Euphorbia hirta* (Gautam & Avasthi 2016b), *Cucurbita maxima* (Thite et al. 2023) and *Cleome spinosa* (Avasthi et al. 2026) The broad host range and effective parasitic action of *Ampelomyces* against powdery mildew pathogens suggest its significant potential in environmentally safe disease management strategies (Daoust & Hofstein 1996).

Furthermore, this genus has a broad global distribution that includes Brazil, Brunei, Bulgaria, Burma, Canada, China, Cuba, Darussalam, Fiji, India, Italy, Myanmar, New Zealand, Poland, the Russian Federation, South Africa, Spain, Sri Lanka, Ukraine, United States, and Venezuela (https://fungi.ars.usda.gov/). There is no information available that any species of *Ampelomyces* is mycoparasite on any powdery mildew infecting *E. tithymaloides*. To the best of our knowledge, this is the first report of mycoparasitism of *Ampelomyces* sp. on powdery mildew of *E. tithymaloides*.

REFERENCES:

Agrios GN, 2005. *Plant Pathology*, 5th Edition. Elsevier Academic Press, USA.

Avasthi S, Gautam AK, Verma RK, 2026. First report of *Ampelomyces* sp. as a mycoparasite of powdery mildew on Cleome spinosa in India. *Plant Pathology & Quarantine* **16** (5), 66–72, Doi 10.5943/ppq/16/1/5

Belsare SW, Moniz L, Deo VB, 1980. The hyperparasite Ampelomyces quisqualis Ces. from Maharashtra State, India. *Biovigyanam* **6**, 173 –176.

Braun U, Cook RTA, 2012. *Taxonomic Manual of the Erysiphales (Powdery Mildews).* CBS Biodiversity Series, Utrecht, Netherlands.

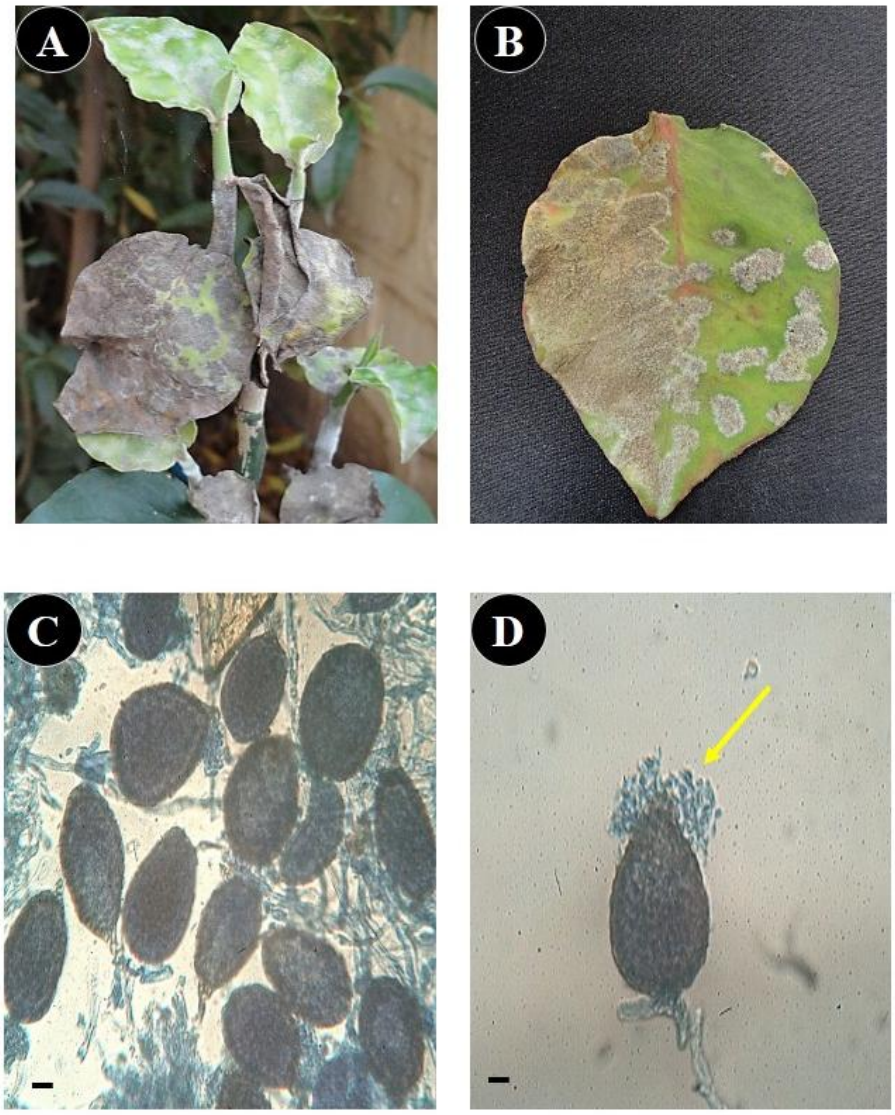

Fig.1 **A** - Host showed powdery mildew infection mixed with mycpaprasite.

B – Upper surface of leaf shows powdery mildew infection mixed with mycoparasite

C- Mycelium, conidia, conodiophores of *Podosphera sp.* parasitized by *A. quiaqualis*.

D- Arrow showed Conidia dehiscence by apical rupture of pycnidium .

Scale bar = 20 µm.

Daoust RA, Hofstein R., 1996. *Ampelomyces quisqualis*, a new biofungicide to control powdery mildew in grapes. In: Brighton Crop Protection Conference Pests & Diseases, vol. 1. Farnham, UK: British Crop Protection Council, 30–40.

Gautam AK, Avasthi S. 2016a. *Ampelomyces quisqualis* – a remarkable mycoparasite on *Xanthium strumarium* powdery mildew from Himachal Pradesh India. *Journal on New Biological Reports* **5**: 1–6.

Gautam AK, Avasthi S. 2016b. *Ampelomyces quisqualis* Ces. – a mycoparasite of *Euphorbia hirta* powdery mildew in Himachal Pradesh, India. *Journal of Phytopathology and Pest Management* **3**(2), 64–70.

Hashioka Y, and Nakai Y, 1980. Ultrastructure of pycnidial development mycoparasitism of and *Ampelomyces quisqualis* parasitic on Erysiphales. Transactions of the Mycological Society of Japan **21**, 329– 338.

Kiss L, Russell JC, Szentiványi O, Xu X, Jeffries P. 2004. Biology and biocontrol potential of *Ampelomyces* mycoparasites. In: Bélanger RR, Bushnell WR, Dik AJ, Carver TLW (eds.), *The Powdery Mildews: A Comprehensive Treatise.* APS Press, Minnesota, USA.

Kiss L, 1998. Natural occurrence of *Ampelomyces* intracellular mycoparasites in mycelia of powdery mildew fungi. *New Phytologist* **140**, 709–714.

Kiss L, 2003. A review of fungal antagonists of powdery mildews and their potential as biocontrol agents. *Pest Management Science* **59**: 475–483.

Kumar V, Chandel S, 2024. Natural occurrence and isolation of *Ampelomyces quisqualis* (mycoparasite) associated with rose, other powdery mildew infecting host plants in Himachal Pradesh, India. *International Journal of Fungi* **1**(2), 23–28.

Legler SE, Pintye A, Caff IT, Gulyás S, 2015. Sporulation rate in culture and mycoparasitic activity, but not mycohost specificity, are the key factors for selecting *Ampelomyces* strains for biocontrol of grapevine powdery mildew (*Erysiphe necator*). European Journal of Plant Pathology **144**(4), 1–14.

Paul YS, Thakur VK, 2006. Indian Erysiphaceae. Scientific Publishers: Jodhpur, India.

Sundheim, L, and Krekling, T, 1982. Host-parasite relationships of the hyperparasite *Ampelomyces quisqualis* and its powdery mildew host *Sphaerotheca fuliginea*. *Journal of Phytopathology*, **104**(3): 202–210.

Thite SV, Pise NM, Bagal SN, Chavan CD. 2023. *Ampelomyces quisqualis* – a remarkable mycoparasite on *Cucurbita maxima* powdery mildew from Satara (M.S.) India. *Plant Pathology & Quarantine* **13**(1), 71–74. Doi.10.5943/ppq/13/1/7

Vaidya, S. and Thakur, V.S. 2005. *Ampelomyces quisqualis* Ces. – a mycoparasite of apple powdery mildew in western Himalayas. *Indian Phytopathology*, **58**(2): 250–251.

Yarwood CE. 1957. Powdery mildews. *Botanical Review* **23**: 235–301.

Cite this article

Kavade S. S. and Thite S. V. 2026. First report of *Ampelomyces quisqualis* as a mycoparasite of powdery mildew on *Euphorbia tithymaloides* from India. *Bioscience Discovery*, **17**(2):187-190.