



A. Sporocarps, habit (bar = 1 mm). B. Spores (bar = 10 µm). [Photographs: A. Michaud]

**Physarum stellatum** (Massee) G.W. Martin, *Mycologia* **39**(4): 461 (1947). [*IndexFungorum* 289681; *Physaraceae*, *Physarales*]  
*Lepidoderma stellatum* Masee, in M.C. COOKE, *Grevillea* **17**(no. 83): 60 (1889). [*IndexFungorum* 182741]  
*Tilmadoche columbina* Rostaf., *Śluzowce (Myxozoa) Monografia Supplement*: 13 (1876). [*IndexFungorum* 189262]  
*Physarum columbinum* (Rostaf.) Sturgis, *Mycologia* **8**(4): 201 (1916), nom. illegit., *ICN Art. 53.1*, non *P. columbinum* Pers., 1795, nec *P. columbinum* T. Macbr., 1893. [*IndexFungorum* 248743]  
*Tilmadoche compacta* Wingate, *Proceedings of the Academy of Natural Sciences of Philadelphia* **41**: 48 (1889). [*IndexFungorum* 189084]  
*Physarum compactum* (Wingate) Lister, *Monograph of the Mycetozoa* Edn 1: 44 (1894), nom. illegit., *ICN Art. 53.1*, non *P. compactum* Ehrenb., 1818. [*IndexFungorum* 205871]  
*Didymium barteri* Masee, *A Monograph of the Myxogastres*: 231 (1892). [*IndexFungorum* 165320]  
*Physarum wingatense* T. Macbr., *The North American Slime-moulds* Edn 2: 72 (1922). [*IndexFungorum* 282110]

*Vernacular names.* French: *physare étoilé*.

*Diagnostic features.* Aside from the unusual star-shaped dehiscence of the sporocarp, the presence of a pseudocolumella distinguishes *P. stellatum* from other similar species with a dense but reticulate capillitium (*P. globiferum* (Bull.) Pers., *P. murinum* Lister, *P. perfectum* M. Peck and *P. scoticum* Ing).

*On natural substratum.* *Plasmodium* pale grey. *Hypothallus* inconspicuous. *Sporocarps* stalked sporangia, gregarious, sometimes crowded, erect or nodding, grey, brownish grey, or iridescent and bronze from lack of lime, color depending upon the amount of lime present. *Sporothecae* globose or slightly depressed below, 0.4–0.6 mm diam., usually umbilicate below, bearing rounded white scales on grey background. *Stalk* calcareous, white or yellowish, often shading to fuscous or black below, rather long, slender, subulate, tapered upwards, 0.5–1.5 mm long. *Peridium* thin, metallic, with thick limy (calcium carbonate) scales on the surface. Dehiscence forming 6–12 characteristic elongated pointed lobes giving the sporocarp a star-like appearance sometimes described as ‘petaloid’ or ‘floriform’. *Capillitium* dense, reticulate, delicate, white or colourless, the remaining nodes few, small, oval or sub-fusiform, many junctions of the net limeless. *Columella* absent, but the capillitium nodes usually forming a central pseudocolumella, though in specimens growing in unfavourable conditions the pseudocolumella may not occur. *Spores* brown *en masse*, pale violet-brown or pale purplish in transmitted light, minutely punctate, minutely spinose or warty, with warts distributed homogeneously, sometimes with groups of darker warts, (7–)8–10 µm diam.

**ASSOCIATED ORGANISMS & SUBSTRATA:** **Plantae.** *Agave americana* L.; *Albizia saman* (Jacq.) Merr. [as *Samanea saman* (Jacq.) Merr.] (wood); *Araucaria* sp.; *Calophyllum inophyllum* L. (leaf); *Cecropia adenopus* Mart. ex Miq.; *Cocos nucifera* L. (litter, spathe); *Dypsis isaloënsis* [name not traced] (litter); *Elaeis guineensis* Jacq.; *Muscopsida* indet.; *Palmae* indet. (litter, stipe); *Pinus densiflora* Siebold & Zucc. (wood); *Piper auritum* Kunth (stalk); *Plantae* indet. (bark, branch, leaf, log, root, stem, stump, trunk, wood); *Platanus occidentalis* L. (bark); *Quercus* sp. (stump); *Roystonea regia* (Kunth) O.F. Cook (rachis). **Associated organism of type specimen.** *Plantae* indet. [as ‘rotten wood’].

**INTERACTIONS & HABITATS:** Most information about this species is based on sporocarps and spores (the dispersal phase), and observed associations with other organisms usually only indicate the physical substratum on which sporocarps form. Other observations are rare, particularly of trophic phases (myxamoebae and swarm cells [individual haploid amoeba-like cells], and plasmodia [multi-nucleate, diploid, and often extensive cytoplasm]), and dormant phases (microcysts and sclerotia). As a result, very little is known about nutrition and interactions beyond broad statements that myxomycetes feed on living bacteria and fungi, and on non-living organic material (MARTIN & ALEXOPOULOS, 1969). For a species with so many records, the lack of information about substrata and habitats is striking; also striking, however, is the fact that some researchers are starting to bring sophisticated technology to bear on this problem (TIUNOV ET AL., 2015). *Physarum stellatum* has been observed on dead wood and bark. It has been recorded from the following habitats: amenity & protected areas; freshwater swamps; woodland (including tropical premontane rain forest). Beyond what is known generally about the nutrition of *Physarum*, there is no information about any specific associations with animals, fungi or micro-organisms.

**GEOGRAPHICAL DISTRIBUTION:** AFRICA: Democratic Republic of Congo, Equatorial Guinea, Ethiopia, Liberia, Madagascar, Morocco, Nigeria, Republic of the Congo, South Africa, Tanzania. CENTRAL AMERICA: Costa Rica, El Salvador, Nicaragua, Panama. NORTH AMERICA: Canada (Ontario, Quebec), Mexico, USA (Alabama, Colorado, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Michigan, Mississippi, Missouri, New Jersey, New York, Ohio, Pennsylvania, South Dakota, Tennessee, Texas, Virginia, Washington, West Virginia). SOUTH AMERICA: Bolivia, Brazil (Amazonas, Bahia, Ceará, Paraíba, Pernambuco, Piauí, Rio Grande do Norte, São Paulo, Sergipe), Colombia, Ecuador, French Guiana, Guyana, Peru, Venezuela. ASIA: Brunei Darussalam, China (Guangxi, Jilin), India (Himachal Pradesh, Maharashtra, Uttar Pradesh, Uttarakhand), Indonesia, Japan, Malaysia, Nepal, Papua-New Guinea, Philippines, Russia (Primorskyi krai), Singapore, Taiwan, Thailand. CARIBBEAN: American Virgin Islands, Antigua and Barbuda, Cuba, Dominica, Dominican

Republic, Guadeloupe, Jamaica, Puerto Rico, Trinidad and Tobago. EUROPE: Germany, Russia (Moscow oblast, Voronezh oblast), Spain. INDIAN OCEAN: La Réunion, Mayotte, Seychelles. PACIFIC OCEAN: Ecuador (Galapagos), Marshall Islands, USA (Hawaii), Vanuatu.

Temperate to tropical. Probably native throughout its known range. Records up to 2450 m above sea level in Costa Rica, 2000 m above sea level in Venezuela, 1180 m above sea level in Jamaica, 1110 m above sea level in Mexico, and 1100 m above sea level in Madagascar.

**ECONOMIC IMPACTS:** No evaluation has been made of any possible positive economic impact of this fungus (e.g. as a recycler, as a source of useful products, as a provider of checks and balances within its ecosystem, etc.). No reports of negative economic impacts have been found.

**INFRASPECIFIC VARIATION:** No subspecific taxa have been described [*SpeciesFungorum*, accessed 29 August 2017].

**DISPERSAL & TRANSMISSION:** Primarily by airborne spores, particularly for longer distances; some local dispersal may also occur by movement of myxamoebae and plasmodia.

**CONSERVATION STATUS: Previous evaluations.** None. **Information base.** Over 900 records (specimens, databases and bibliographic sources combined, excluding duplicates) from at least 1876 to July 2016, with observations in January, February, April, May, June, July, August, September, October, November and December. A study in Thailand showed inconclusive evidence of seasonality in appearance of sporocarps (KO *ET AL.*, 2011). **Estimated extent of occurrence** [calculated using <http://geocat.kew.org>]. Over 80.0 million km<sup>2</sup> (Africa (including Indian Ocean islands): 26.4 million km<sup>2</sup>; Asia: 31.7 million km<sup>2</sup>; Caribbean, Central America and North America: 16.8 million km<sup>2</sup>; Europe: 1.0 million km<sup>2</sup>; Pacific Ocean: insufficient data; South America: 4.1 million km<sup>2</sup>). **Estimated area of occupancy** [calculated using <http://geocat.kew.org>]. Well over 750 km<sup>2</sup>. The method for estimating area of occupancy has produced an artificially low figure. The species is likely to be under-recorded, despite the admirable and well-organized enthusiasm of often amateur myxomycete experts, because compared with recording of flowering plants and vertebrates, so few people have the skills to search for and identify it, but it is now being reported in many rapid biodiversity assessments in the neotropics, eg. SCHNITTLER *ET AL.* (2002). At least some of the plants with which it is associated are common and widespread species. **Threats.** Insufficient information to enable threats to be identified. **Population trend.** In general not known. Occasional in south India (STEPHENSON *ET AL.*, 1993). Of datable records, c. 30% are pre-1961, 60% post-1960 but pre-2001, and 10% post-2000. **Evaluation.** Using IUCN criteria (IUCN SPECIES SURVIVAL COMMISSION. 2006 *IUCN Red List of Threatened Species* [[www.iucnredlist.org](http://www.iucnredlist.org)]. Downloaded on 15 May 2006), the species is assessed globally as Least Concern. **In situ conservation actions.** None explicitly directed at this species, but many of the sites from which it has been recorded are protected, for example as nature reserves. **Ex situ conservation actions.** *Physarum* species, including the present species (CLARK, 1995), grow readily in culture and, using simple techniques, can be induced to sporulate. There are, however, no living strains of this species listed by the Straininfo website [[www.straininfo.net](http://www.straininfo.net), accessed 4 August 2017]. Two partial nucleotide sequences of small subunit ribosomal RNA were found in a search of the NCBI GenBank database [[www.ncbi.nlm.nih.gov](http://www.ncbi.nlm.nih.gov), accessed 13 August 2017].

**NOTES:** For further help with identification, the excellent keys provided by POULAIN *ET AL.* (2011) should be consulted.

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Issued by CABI, Bakeham Lane, Egham, Surrey, TW20 9TY, UK

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