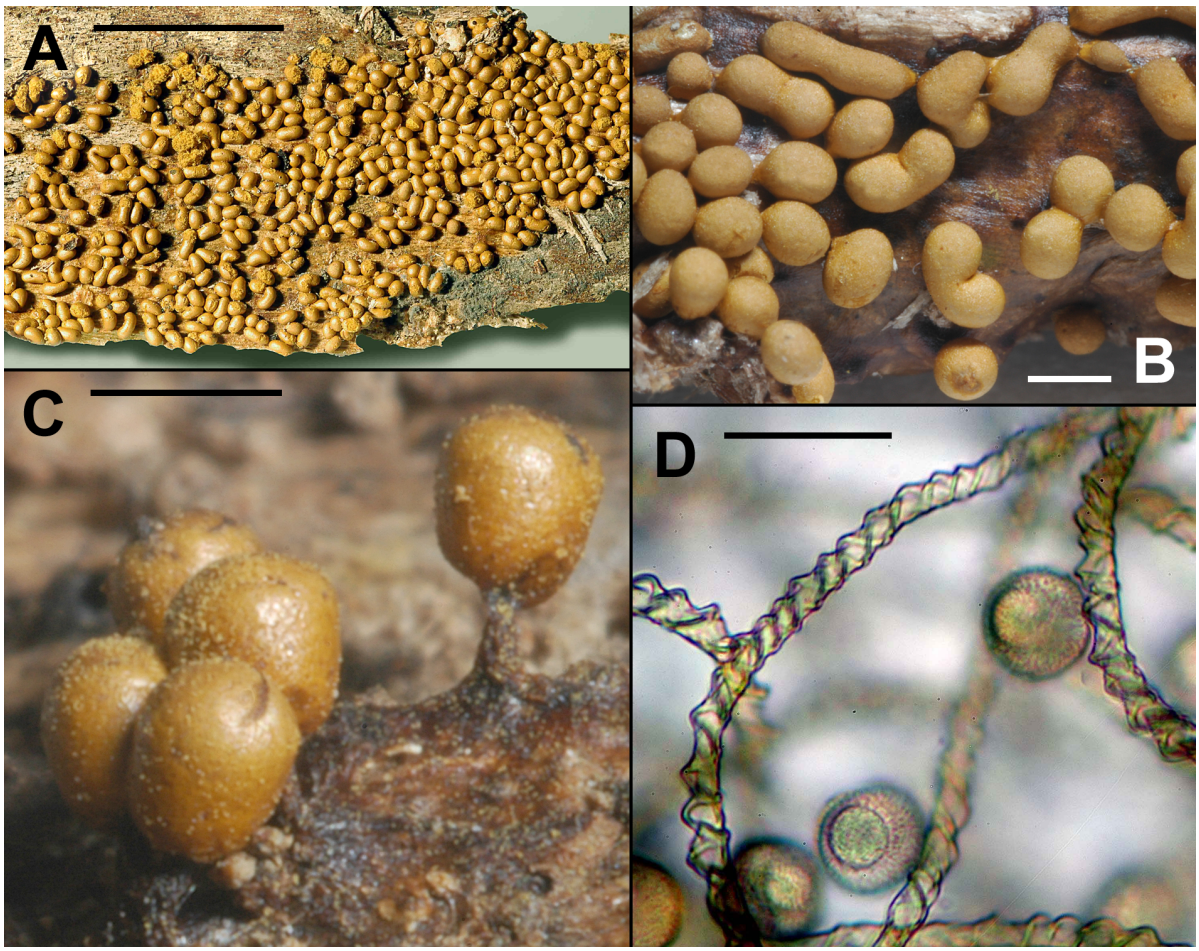
IMI Descriptions of Fungi and Bacteria
No. 1920

TRICHIA VARIA



A. Sporocarps, habit (bar = 10 mm). **B**. Sporocarps, detail showing short plasmodiocarp form (bar = 1 mm). **C**. Sporocarps, detail showing short-stalked sporangial form (bar = 1 mm). **D**. Capillitium and spores (bar = 20 µm). [Photographs: A. Michaud]

Trichia varia (Pers. ex J.F. Gmel.) Pers., *Neues Magazin für die Botanik* **1**: 90 (1794). [*IndexFungorum* 202729]

Stemonitis varia Pers. ex J.F. Gmel., *Systema Naturae* **2**: 1470 (1792). [*IndexFungorum* 217513]

Trichia olivacea Pers., *Observationes Mycologicae* **1**: 62 (1796). [*IndexFungorum* 158203]

Trichia cordata Pers., *Observationes Mycologicae* **2**: 33 (1800). [*IndexFungorum* 140047]

Trichia nigripes var. *cordata* (Pers.) Pers., *Synopsis Methodica Fungorum* **1**: 179 (1801). [*IndexFungorum* 499071]

Trichia cylindrica Pers., *Observationes Mycologicae* **2**: 33 (1800). [*IndexFungorum* 241143]

Trichia nigripes var. *cylindrica* (Pers.) Pers., *Synopsis Methodica Fungorum* **1**: 179 (1801). [*IndexFungorum* 499072]

Trichia nigripes Pers., *Synopsis Methodica Fungorum* **1**: 178 (1801). [*IndexFungorum* 168441]

Trichia varia var. *nigripes* (Pers.) Rostaf., *Śluzowce (Mycetozoa) Monografia*: 251 (1875). [*IndexFungorum* 137372]

Lycoperdon luridum R.A. Hedw., *Observationes Botanicae* **1**: pl. 11a (1802). [*IndexFungorum* 153042]
Trichia varia var. *diluta* Pers., *Synopsis Methodica Fungorum* **1**: 181 (1801). [*IndexFungorum* 499080]
Trichia varia var. *subrufescens* Pers., *Synopsis Methodica Fungorum* **1**: 181 (1801). [*IndexFungorum* 499081]
Trichia varia var. *sessilis* Rostaf., *Śluzowce (Mycetozoa) Monografia*: 253 (1875). [*IndexFungorum* 137377]
Trichia aculeata L.F. Čelak, *Archiv für die Naturwissenschaftliche Landesdurchforschung von Böhmen* **7**(5): 34 (1893). [*IndexFungorum* 188446]
Trichia varia var. *irregularis* Meyl., *Bulletin de la Société Vaudoise de Sciences Naturelles* **44**: 298 (1908). [*IndexFungorum* 569103]
Trichia varia var. *aurata* Meyl., *Bulletin de la Société Vaudoise de Sciences Naturelles* **44**: 299 (1908). [*IndexFungorum* 569104]
Trichia varia var. *olivacea* Brândza, *Bulletin Trimestriel de la Société Mycologique de France* **44**: 280 (1928). [*IndexFungorum* 281359]
Trichia synspora Kowalski & McNichols, in KOWALSKI, *Mycologia* **66**(2): 372 (1974), as '*synsporum*'. [*IndexFungorum* 324879]

Diagnostic features. The prominently lop-sided elaters and characteristic milky white plasmodium which later changes through very pale yellow to ochraceous are the features which enable this most common species to be identified. Characters that separate it from *Hemitrichia abietina* (Wigand) G. Lister, *Trichia scabra* Rostaf., greyish forms of *T. contorta* G.H. Otth and members of the *T. favoginea* (Batsch) Pers. complex are its capillitium tubes with 2 or 3 spiral bands which are asymmetrical (more prominent on one side), and spores faintly but densely warted.

Habit. On dead wood, bark, fallen leaves, and occasionally other substrata including dung. *Plasmodium* densely milky white, becoming yellow as the sporangia form. *Sporocarps* gregarious or crowded, grouped or scattered, frequently in large groups, comprised of sessile or short-stalked sporangia, or short plasmodiocarps, or rarely subplasmodiocarpous. *Hypothallus* membranous, common to the whole fructification, broadly expanded, horny but nearly colourless, inconspicuous. *Stalks* when present stout, erect, cylindrical, longitudinally striate, dark brown, blackish, or black, opaque, furrowed, thick, 0·1–0·4 mm high, 0·3–0·4 mm diam. *Sporangia* if stalked then slightly top-shaped, sessile sporangia usually pulvinate, 0·6–1·2 × 0·5–0·9 mm, dull yellow, shining yellow, ochraceous, olivaceous, olive-brown, light yellowish brown, or sometimes greyish, globose, subglobose, subcylindrical, obovoid or sometimes elongate, sometimes angular due to mutual pressure, with a deep, trumpet-shaped calyculus with convex and torn sides, occasionally encrusted with refuse material but usually smooth. *Plasmodiocarps* short, oblate, allantoid to vermiform or ring-shaped, sessile, with convex sides, 1–2 mm in extent, 0·5–0·8 × 0·5–0·9 mm. *Peridium* single, membranous, thin, translucent, light yellow to light greenish yellow by transmitted light, the inner surface faintly and densely punctuate or with many faint irregular striations, frequently with alveolate depressions, sometimes with tuberculate appendages; dehiscence apical and irregular, partially evanescent, remaining at base as a cap. *Capillitium* of simple or rarely branched elaters, elastic, entangled, bi-refringent in polarized light, strong yellow to light greenish yellow by transmitted light, without attachment to the peridium, 3–5 μm diam., bearing 2 (or 3) narrow, well separated, pronounced, smooth, slightly irregular spiral bands, one side of the elater showing a more prominently angled band on one side, thus giving a somewhat serrated appearance under oil immersion, the apices often swollen behind the conical tip, the free ends curved and pointed, *c.* 10–20 μm long. *Spores* yellow to orange-yellow in mass, individually free, subglobose, dull pale yellow to colourless, verruculose, delicately warted, with the appearance of spots, (11–)12–14 μm diam.

ASSOCIATED ORGANISMS & SUBSTRATA: **Animalia**: *Androniscus dentiger* Verhoeff; *Cylindroiulus punctatus* (Leach); *Mammalia* indet. (dung); *Oniscus asellus* L.; *Trichoniscus pusillus* Brandt. **Fungi**: *Ascomycota* indet. (stroma); *Epochnium macrosporoideum* Berk. & Broome; *Rosellinia* sp. **Plantae**: *Abies alba* Mill. (wood), *A. borisii-regis* Mattf. (wood), *A. sibirica* Ledeb.; *Acer campestre* L. (wood), *A. platanoides* L. (bark, seed, wood); *Alnus glutinosa* (L.) Gaertn. (wood); *Anomodon viticulosus* (Hedw.)

Hook. & Tayl.; *Betula pendula* Roth (wood), *B. tianschanica* Rupr.; *Carpinus betulus* L. (stump, wood); *Crataegus* sp. (wood); *Eucalyptus camaldulensis* Dehnh. (wood), *E. globulus* Labill. (wood); *Fagus sylvatica* L. (stump, trunk, wood); *Fraxinus excelsior* L. (wood); *Juglans regia* L. [as *J. fallax* Dode]; *Picea abies* (L.) H. Karst. (bark, stump, trunk, wood), *P. schrenkiana* Fisch. & C.A. Mey.; *Pinus pinea* L. (wood), *P. sylvestris* L. (bark, wood); *Plantae* indet. (wood); *Platanus orientalis* L. (branch); *Populus alba* L. (branch), *P. balsamifera* L., *P. tremula* L. (bark, wood); *Pyrus communis* L. (wood); *Quercus faginea* Lam. (wood), *Q. ilex* L. (wood), *Q. petraea* (Matt.) Liebl. (wood), *Q. pyrenaica* Willd. (wood), *Q. robur* L. (bark, wood), *Q. suber* L. (wood); *Rubus* sp. (wood); *Salix* sp.; *Sorbus sibirica* Hedl., *S. tianschanica* Rupr.; *Tilia cordata* Mill. (wood), *T. tomentosa* Moench (branch); *Ulmus glabra* Huds. (wood), *U. laevis* Pall. (stump), *U. minor* Mill. (wood), *Ulmus* sp. (wood).

INTERACTIONS & HABITATS: At least one species of millipede and three species of woodlice have been observed grazing on plasmodia and sporocarps of *Trichia varia* (ING, 1967). No other specific information was found during the present work about interactions between *Trichia varia* and other organisms, but myxomycetes in general, in their plasmodial state, are known to feed on bacteria, yeasts and other single-celled organisms, and they themselves provide food for insects, particularly beetles, and other animals. Some beetle species are known only from myxomycetes, and for some of these there may be a close symbiosis. Myxomycetes may also be found in association with fungi, and some fungi have been found only on myxomycete sporocarps and, presumably, derive their nutrition from them either as parasites or as saprobes. *Trichia varia* sporocarps are generally observed on dead parts of plants, using the plant material as a substratum, but probably not as a nutrient source. The species is very widely distributed and abundant, but only at higher altitudes in the tropics. It is particularly common on wood of angiosperms, less so on that of gymnosperms, preferring very rotten, usually soggy wood or dead bark. It has also occasionally been recorded from non-woody plants.

GEOGRAPHICAL DISTRIBUTION: AFRICA: Algeria, Burundi, Democratic Republic of the Congo, Rwanda, South Africa. CENTRAL AMERICA: Costa Rica, Nicaragua. NORTH AMERICA: Canada (Alberta, British Columbia, Nunavut, Ontario, Québec), México, USA (Alaska, Arizona, Arkansas, California, Colorado, Idaho, Iowa, Minnesota, Mississippi, Montana, Pennsylvania, Texas, Washington, West Virginia). SOUTH AMERICA: Brazil, Colombia, Ecuador, Venezuela. ANTARCTICA: South Shetland Islands. ASIA: Armenia, Bhutan, China (Hebei, Heilongjiang, Jilin), Georgia, India (Uttar Pradesh), Israel, Japan, Kazakhstan (Alma-Atinskaya oblast, Karagandinskaya oblast, Kustanaiskaya oblast, Severo-Kazakhstanskaya oblast, Vostochno-Kazakhstanskaya oblast), Nepal, Pakistan, Russia (Altaiskyi krai, Chukotka autonomous okrug, Krasnoyarskyi krai, Magadan oblast, Sverdlovsk oblast, Taimir autonomous okrug, Tiumen' oblast), Sri Lanka, Turkey, Uzbekistan. AUSTRALASIA: Australia (Tasmania, Victoria, Western Australia), New Zealand. CARIBBEAN: Bahamas, Jamaica. EUROPE: Albania, Andorra, Austria, Belarus, Belgium, Bulgaria, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Ireland, Italy, Lithuania, Luxembourg, Moldova, Montenegro, Netherlands, Norway, Poland, Portugal, Romania, Russia (Astrakhanskaya oblast, Bashkortostan, Kalininskaya oblast, Komi autonomous republik, Kursk oblast, Leningrad oblast, Moscow oblast, Stavropol'skyi krai, Volgograd oblast), Serbia, Spain, Sweden, Switzerland, Ukraine, United Kingdom, Vatican City. PACIFIC OCEAN: USA (Hawaii).

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

INFRASPECIFIC VARIATION: This species is very variable, and the many varieties and forms which have been published for it reflect the different attempts to describe that variation. All are listed in the synonymy above. None are currently widely used.

DISPERSAL & TRANSMISSION: Nothing specific is known about *Trichia varia*. Myxomycete spores are produced in dry dusty masses inside sporocarps. The sporocarp outer wall fragments to expose the spores

which are then, most probably, primarily dispersed by wind. This dispersal is likely to be totally random unless there is a strong prevailing wind in the vicinity. Insects are known to graze on myxomycete sporocarps, and spores have frequently been found in their faeces. This is therefore also likely to be an important part of their dispersal mechanism. Insect dispersal has the potential to be less random than wind dispersal, but there seem to be no studies of how long spores may remain in an insect digestive tract or of insect movements in relation to myxomycete spore dispersal. After the spores have landed on plant material, each may germinate to produce a single-celled zoospore with one or two flagella. This zoospore may then use its flagella to disperse locally. The zoospores subsequently transform into amoeba-like cells which reproduce by mitosis and aggregate, forming groups which are sometimes sufficiently large as to be seen with the unaided eye. These groups, which are called plasmodia, can also migrate, often in response to light. For almost the whole life cycle, therefore, myxomycetes are mobile organisms, with only the sporocarp stage being fixed in a single location. Unlike members of the kingdom *Fungi*, myxomycetes do not form hyphae, and do not derive nutrition from the plant substrata on which they are found. As a result, it is not meaningful to describe them in terms of transmission. There is no infection stage, and no colony formation inside plant material. Instead, the individual amoebae derive their nutrition by engulfing bacteria, yeasts and other single-celled organisms.

CONSERVATION STATUS: **Information base**. More than 3000 records (specimens, databases, bibliographic sources and field observations combined, excluding duplicates) from 1792 to 2012, with observations in January, February, March, April, May, June, July, August, September, October and November, with the main fruiting season in the northern hemisphere from June to October. The species is widely regarded as common. Most if not all of its known associated organisms are common and likely to be classified as Least Concern by the IUCN. **Estimated extent of occurrence** [calculated using *http://geocat.kew.org*]. Nearly 71·6 million km^2 (Africa: 7·9 million km^2; Central America: insufficient data; North America: 12·4 million km^2; South America: 2·3 million km^2; Asia: 39·9 million km^2; Australasia: insufficient data; Caribbean: insufficient data; Europe: 9·1 million km^2). **Estimated area of occupancy** [calculated using *http://geocat.kew.org*]. About 292 km^2. The method for estimating area of occupancy has probably produced an artificially low figure. **Population trend**. Not reported, but sufficient records exist for some analysis to be possible. **Threats**. No specific threats have been identified. **Evaluation**. Using IUCN criteria (IUCN SPECIES SURVIVAL COMMISSION. *2006 IUCN Red List of Threatened Species*, *www.iucnredlist.org*. Downloaded on 15 May 2006), the species is assessed globally as Least Concern. ***In situ* conservation actions**. None noted. Many recent records, however, originate from protected areas. ***Ex situ* conservation actions**. One nucleotide sequence was found in a search of the NCBI GenBank database [*www.ncbi.nlm.nih.gov*]. No living strains of this species were found in a search of the ATCC, CABI, CBS and ICMP culture collection on-line catalogues.

NOTES: The distribution map of this species on the *Eumycetozoan Project* website [*http://slimemold.uark.edu*] provides further georeferenced records but some errors may have occurred in allocating latitudes and longitudes. The record on that map in the northern Pacific Ocean is, in reality, from New Zealand, a record apparently from the Atlantic Ocean, off the coast of west Africa, is in reality from the USA, a record apparently from southwest Kazakhstan is, in fact, from Germany, and a record from Russia, apparently from Krasnoyarskyi krai, is in fact from the Urals.

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See also the following internet pages:

- *Checklist of Fungi of the British Isles* [*www.fieldmycology.net/GBCHKLST/gbchklst.asp*].
- *Cybertruffle* [*www.cybertruffle.org.uk*].
- *GBIF* [*http://data.gbif.org/welcome.htm*].
- *Google* [*www.google.co.uk*].
- *Landcare Research New Zealand* [*http://nzfungi.landcareresearch.co.nz*].
- *Myxomycetes of Ukraine* [*www.myxomycet.com.ua/eng*].
- *National Center for Biotechnology Information* [*www.ncbi.nlm.nih.gov*].
- *Nomen.eumycetozoa.com* [*www.nomen.eumycetozoa.com*].
- *The Eumycetozoan Project* [*http://slimemold.uark.edu*].
- *USDA Fungal Databases* [*http://nt.ars-grin.gov/fungaldatabases/index.cfm*].

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