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BRITISH TREMELLA SPECIES I: *TREMELLA A URANTIA & T. MESENTERICA*

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All species of the heterobasidiomycete genus *Tremella* Pers.: Fr. live on other fungi. Some are large, familiar jelly fungi', others are intrahymenial parasites invisible to the naked eye. Perhaps surprisingly, the genus is little-known even in Britain where we have over thirty species parasitizing other jelly fungi, corticioid fungi, polypores, pyrenomycetes, and lichens. Tha.-_quently diagonal, often vertical, occasionally almost lateral. *Spores* subglobose to ellipsoid (Q = 1.1-1.4), 5.5-9.0 *x 4.5-7.0 µm* from prints of British collections; some producing secondary spores; germinating by gerrn tube or yeast-like conidial cells *(2.0-4.0 x 1.5-3.0* µm), which often form a dense mucous layer over the hymenial surface.

laigest of these produce conspicuous, foliaceous or brain-like, gelatinous fruit bodies, easy to find in almost any woodland after wet weather. Many can be recognized on sight, though they can be confused with gelatinous ascomycetes (most of which are pinkish or violaceous in colour) or species *of Exidia* Fr., a genus *of* saprotrophic (nonparasitic) heterobasidiomycetes. Microscopically, *Tremella* species can immediately be distinguished by their large, septate basidia and globose or short ellipsoid spores *(Exidia* species nearly all have sausage-shaped spores).

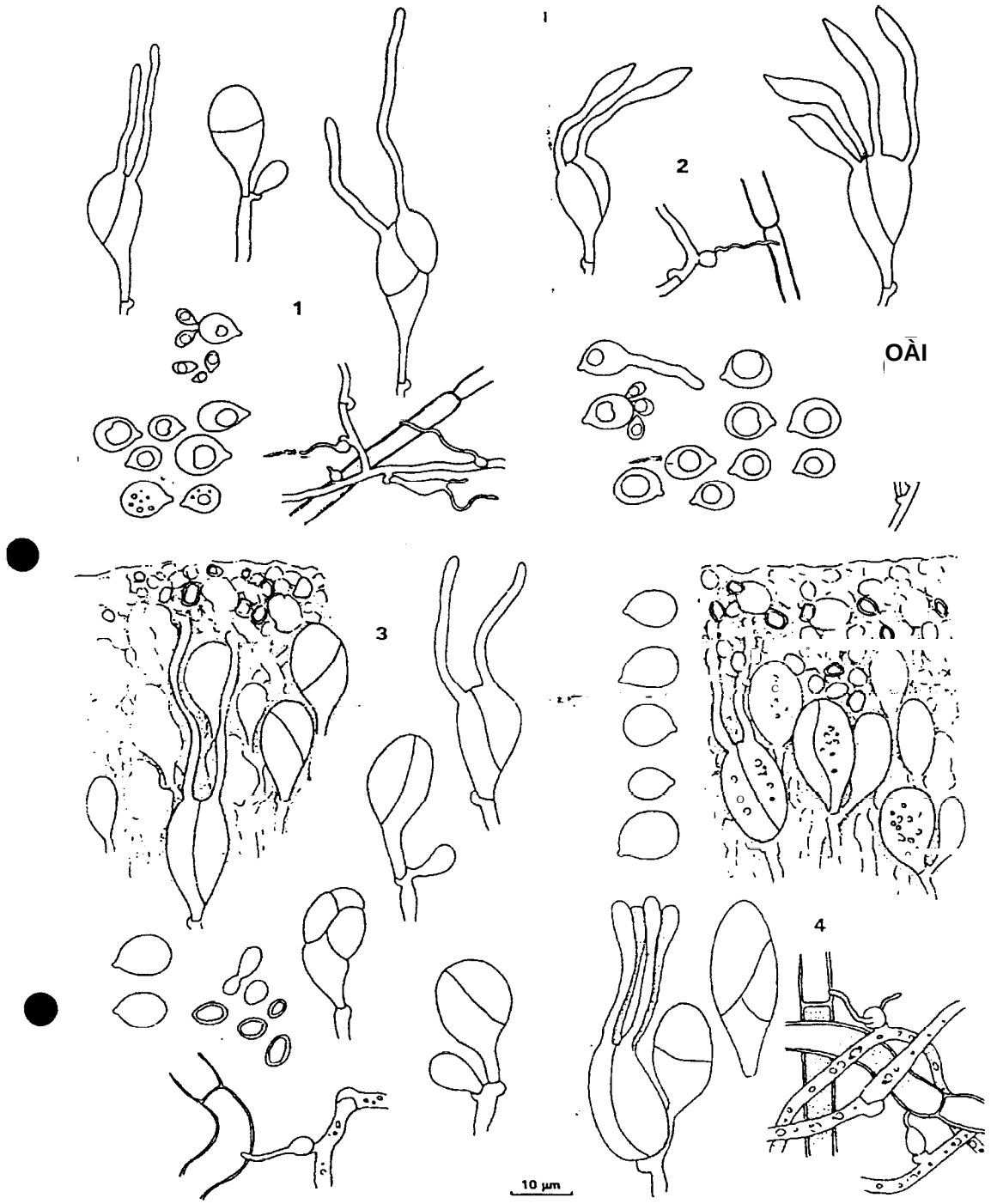
This payer takes a look at two large, bright yellow *Tremella* species which seem to have been much confused, to the extent that one appears to have been completely overlooked in Europe.

Tremella aurantia Schweinitz: Fr., *Schrift. Nat. Ges. Leipzig 1: 114 (1822)* (Figs 1-5) *Tremella australiensis* Lloyd, *Myc. Writ. 4: 45 (1913)*

?Tremella frondasa Fr., *Syst. Myc. 2: 212 (1822) [nom. dub.]*

Basidiomes gelatinous, compact and dense.ly folded at first, becoming large, frondose, and up to 15 cm or more across. Bright `orange' *(British Fungus Flora* colour chart) when compact, becoming 'luteous' when expanded, pallid when old or swollen with rain-water; surface normally matt, sometimes with a fine whitish pruina; on or with fruit bodies of *Stereum hirsutum* (Willd.: Fr.) S.F. Gray on deciduous trees. *Hyphae* in a dense gelatinous matrix, thin, clamped, often with yellowish contents, producing abundant haustorial cells some of which are attached to the unclamped,, ribbon-like hyphae of the *Stereum* host which can be found throughout the fruit body. *Basidia* 2-4 septate, mostly widely clavate or stalked ellipsoid, some subglobose, *ca 9-13* µm avide (a few occasionally wider); septa mort fre

Specimens examined:
ENGLAND: Unlocalized, undated, Rev. A. B[loxam?1, ex Herb. Berkeley, K[M] 28993. DEVON: hlamhead, Great Haldon Forest, with *Stereum* hirsutum on decorticated log, probably Fagus, 18 Dec. 1993, P. Roberts 804, K[M] 28360; Ashclyst Forest, Broadclyst, with S. hirsutum on dead *Quercus* branch, 14 Jan. 1994. P. Roberts 821, K(M) 28362; Bystock Reservoir, Exmouth, with *Stereum hirsutum* on deciduous log, 6 Nov. 1994, P. Roberts, K(M) 28366. HEREFORDSHIRE: Yazor, on rotten log, 2 Jan. 1949, S. Balles, KtM) 28994. KENT: near Sevenoaks, on *?Corylus,* 26 Oct. 1963, P.J. Houlton, K(M) 28839; Lords Wood, near Romney Marsh, on dead deciduous bough, 17 Dec. 1964, P.J. Houlton, K(M) 28855-?LEICESTERSHIRE: ?Twycross, undated, A. Bloxam, K(M) 28938. SOMERSET: Horner Woods, on *Quercus,* 17 Sep. 1960, D.A. Reid, K(M) 28826. ?SURREY: Woodhill Park, on *Quercus,* Nov. 1872, ex Herb C.E. Broome, K(M) 28857. WALES: PEM$ROKESHIRE: Walwyn's Castle, near Milford Haven, on Quercus, 6 Apr. 1958, P.W. James, K(M) 28840. RADNORSHIRE: wood in head of cwm above Treburvaugh, Liangunilo, W. of Knighton, 5 Oct. 1969, R.W.G. Dennis, K(M) 28835. CHANNEL ISLANDS: JERSEY: St Catherine 's Valley, with *S. hirsutum* on dead attached *Quercus* branch, 12 Nov. 1993, P. Roberts 770, K(M) 28359. FRANCE: Forêt de Fontainebleau, on rotten trunk, Oct. 1881,



Figs 1-4 *Tremella aarantia*. *(1)* Basidia and spores (one producing yeast-like conidia) from print, and hyphae showing haustorial cells attached to unclamped host hypha (St Catherine s Valley, Jersey, *K(M) 28359); (2)* basidia and spores, one of the spores shown germinating by germ tube (Mamhead, Devon, *K(M) 28360); (3)* section of hymenium (showing surface layer of conidia), basidia, two basidiospores and detached conidia, haustorial cell and host hypha (isotype collection, *K(M) 28997); (4)* the same (isotype of T. *australiensis*, *BPI 702691).*

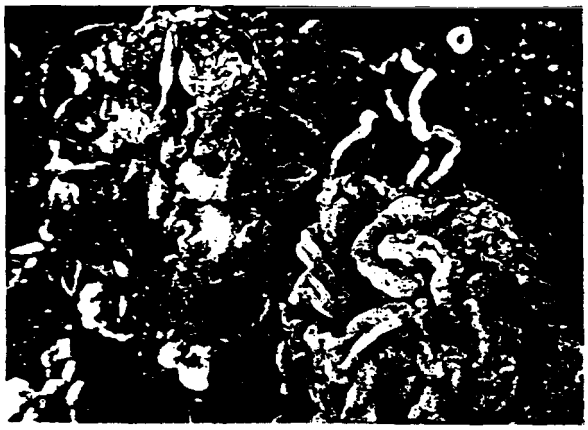


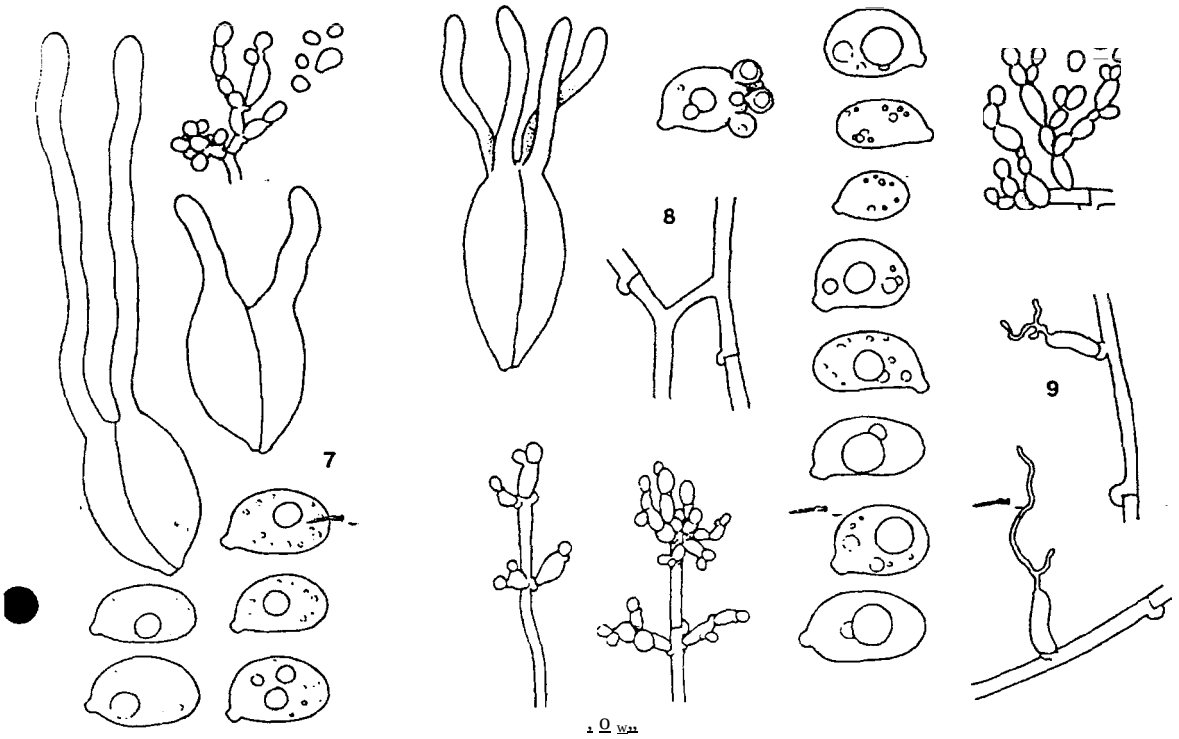
Fig 5 *Tremella aurantia* (Ashclyst Forest, Devon, K(M)

Fig 6 *Tremella mrsentenca* inear ~ istman's Wood. Dart moor, Devon ~

R. Roumeguère (Fungi Gallici **Exs.** 2111), K(M) 29278; Aujargues, Gard, on *Quercus, 4* Oct. 1994, E.W. Brown, K(M) 28365. **GERMANY:** Jungfernheide, Berlin, on *Quercus, Nov.* 1889, P. Sydow (Mycotheca Marchica 2812). K(M) 29267 & K(M) **29272. POLAND:** Bialowieza Forest, 19 Oct. 1981, D.N. Pegler 3462, K(M) **29265. ROUMANIA:** Seibenburgen, Gotzenberg, Heltau, Hermannstadt (Sibiu), on *Quercus,* 4 Aug. 1922, K.H. Rechinger, K(M) 28477. TURKEY: BoluYigilca, on old *Carpinus* log, 30 Nov. 1977, S. Sumer 27, K(M) **29257. CANARY ISLANDS:** TENERIFE: Monte de Los Silos, on rotten wood, 17 Mar. 1986, C. L. Champion, K(M) **19451;** Anaga, on *Laurus azorica,* 22 Jan. 1990, M. Williams, K(M) 18809. **MADEIRA:** Faial, on Laurus, 12 Jul. 1850, ex herb. M.J. Berkeley, K(M) **29244;** Ribeiro Frio, Nevada del Furado, on *Eucalyptus,* 15 Mar. 1995, B.M. Spooner, K(M) **28834. UNITED STATES:** unlocalized, undated, L.D. von Schweinitz `6', ex Herb. Hooker, K(M) 28997, isotype. NORTH CAROLIh;-kr. -undated.r••_ `430', ex Herb. Berkeley, K(M) 29000, isotype. SOUTH CAROLINA: ?Pinepolis, on sticks, ?Jan. 1884, H.W. Ravenel, K(M) 29002; Santee Canal, on damp rotten wood, Dec., H.W. Ravenel 123, K(M) 29005. AUSTRALIA: NEW SOUTH WALES: Twofold Bay, Tyrone, undated, White (ex herb. NLC. Cooke), K(M) 29246; SOUTH AUSTRALIA: Mount Lofty, 1881, Tepper iex herb. M1f.C. Cooke), K(M) 29247; VICTORIA: Daylesford. Aug. 1880, R. Wallace ~ex herb. ALC. Cooke', K(NI) 2P252; titelbcu:.^.e. ur.dzted. Lr Févre tex herb. NIC- Cooke). K(M) 29250: unlncalized, G.H. Adcock ~ex herb. C.G. Lloyd 4010), BPI 702691, holotype of *Tremella australiensis:* WESTERN AUSTRALIA: Lake Aiuir, 1881, T. Muir (ex herb. bLC. Cooke), K(M) 29253.

Tremella aurantia is something of a mystery. since it appears to be fairly common yet previously unreported in Britain or indeed Europe (though Weinmann (1836) used the name for a Russian collection). The older, pre-1990 speci mens cited above were originally identified variously as *T. mesenterica, T. lutescens,* or *T. frondosa.* The last taxon, *Tremella frondosa,* is best considered a nomen *dubiunz,* but could «ell represent *T. aurantia.* Fries (1522) described it as `maxima . . . luteo-pallescens . . . Ad truncos *vetustos quericinos'.* which would easily accommodate mature specimens of T. *aurantia.*

Tremella aurantia is readily recognizable in the field when found growing on or with its host, *Stereum hirsutum,* a common, tiered, bracket-like fungus with a smooth, ochraceous-orange under-surface. Otherwise it is similar to *T. mesenterica,* though normally matt (not shiny or greasy), and



Figsi-9 *T'remella mesertterica.* (7) Basidia, spores from print, and conidiophores iOrle} Common, Devon. (K(NI)26059): (Si basidium, clamped hyphae, spores from print ~one germinating), and conidiophores (K(M) 26057), l9i conidiophores and haustorial celis from young, conidial specimen iK(bI) 260G1~

often much larger. The parasite seems to enter the host fruit body whilst it is still developing and completely takes it over, so that no external trace of the host normally remains. In old, deliquescent fruit bodies a poorly-defined whitish core of host hyphae can sometimes be seen, but this is not so

- bvious as the core found in *Tremella encephala* Pers.: Fr., a flesh-coloured species parasitizing *Stereum sanguinolentum* (Alb. & Schw.: Fr.) Fr. on conifers.

Microscopically, *Tremella aurantia* can be distinguished from *T. mesenterica* by its smaller, more subglobose spores, smaller basidia, and the presence of unclamped host hyphae in the subhymenium and context. The üymenium 'ts normally covered by a thick mucous layer full of basidiospores and yeast-like conidia, which presumably i; why the surface of the fruit body appears matt and,.often_pruinose. Bandoni (1961) notes the production of conidia from conidiophores in the hymenium, but this has not been observed in the specimens cited, in which the conidia appear to be derived from germinating basidiospores.

In America, there is at least one other yellow species parasitizing *Stereurn hirsutum,* namely *Tremella tremelloides* (Berk.) hfassee which can be distinguished *inter afia by* its mainly globose, unstalked basidia. Several other non-European species have also been described on the same host.

Tremella mesenterica Retz.: Fr., *Kongi. Vet. Acad. Handl. 30: 249 (1769)* (Figs. *6-9)*
?Tremella lutescens Pers.-Fr., Myc. Eur. 1: 100 (1822) [nom. dub.]

Basidiomes gelatinous, pustular to foliaceous, sometimes small and remaining so, often large and conspicuous; bright 'orange' to 'luteous' *(BritsF. Fungus Flora* colour chart), occasionaily pallid or entirely unpigmented and white; normally shiny to greasy, not matt. Parasitic on mycelia of *Peniophora* Cooke, and often found

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close to the fruit bodies. *Hyphae* in a gelatinous matrix, atl hyphae clamped, haustorial cells seldom seen except in young, conidial specimens (Fig. 9). *Basidia* 2-4 septate, ellipsoid to subglobose, not or rarely stalked, average size larger than in *T. aurantia, ca* 15-21 µm wide; septa most frequently diagonal or vertical. *Conidiophores* densely branched and normally abundant in the hymenium; young specimens may be entirely conidial. Conidia subglobose, ovoid, or ellipsoid, *ca* 2.0-3.0 x 2.0-2.5 µm, often so numerous that young fruit bodies may be covered in a bright yellow, conidial slime. *Spores* broadly ellipsoid to oblong (Q = 1.2-1.8), on average much larger than in *T. aurantia, (8.0-) 10.0-16.0 (-18.0)* x 6.0- 9.5 (-12.0) µm from prints of cited specimens; that there appear to be no records of *T. mesenterica* producing secondary spores; germinating by germ tube or by yeast-like conidia of identical form to the conidia produced on the conidiophores.

Specimens examined:
ENGLAND: DEVON: Orley Common, Ipplepen, on dead attached *Ulex* branch. 28 Nov 1993, P. Roberts 786, K(M) **26057;** same location and date, on *Fraxinus, P.* Roberts 787, K(M) 26059, same location, 5 Jan. 1994. on Rosa briar. P. Roberts 818, K(M) 26061.

Tremella mesenterica is a common and ubiquitous species, and the specimens cited above are just a small sample of those seen. At K there are over 80 collections covering all parts of the British Isles, from Orkney to the Channel Islands. Material has also been examined from North America, Africa, and Australia. The species has been thoroughly redescribed by Wong et al. (19851, who selected a neotype based on a specimen from Sweden.

T. mesenterica is primarily (perhaps exclusively) a parasite of *Peniophora,* a genus of patch-forming corticioid fungi, though it appears to parasitize the mycelial hyphae rather than the fruit bodies of the host. Often *T. mesenterica* can be found growing on the upper surface of a twig with the *Peniophora* producing fruit bodies on the underside. Zugmaier et al. (1994) have examined the host-parasite interaction and note that, in culture, *T. mesenterica* will attempt to parasitize a range of other wood-decaying fugi, but apparently without success.

In Britain, *T. mesenterica* is particularly common on gorse *(Ulex)* where its main host is *Peniophora incarnata (Fr.)* Karsten, a reddishorange corticioid fungus. Since this particular host also occurs occasionally on conifers (as do a number of other *Peniophora* species), it seems odd that there appear to be no records of *T. mesenterica* occasionally producing *tca* on conifers in Britain.

Pallid fruit bodies have sometimes been given the name *Tremella lutescens,* but there is nothing to suggest the existence of a third yellow *Tremella* species in Europe, and T. *lutescens* is now regarded as a *nomen dubium,* probably synonymous with *T. mesenterica.* White, unpigmented or albino fruit bodies have sometimes been given the names *Tremella albida* Huds.: Fr. or *Tremella candida* Pers. Both are *nomina dubia.* Outside Europe, a n:.:^bc, of aadai„nal species are known.

References

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Fries. E. ~ 1822) Systema Mycologicum Vol 2.

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Wong, G.J., Welis, K., 8; Bandoni, R.J. l1985i Interfertility and comparative morphological studies *of Tremefla mesenterica. Mycologia* 77: 36-49.

Zugrnaier, W., Bauer, R., & Oberwinkler, F. (19941 hlycoparasitism *of* some *Tremella* species. *Mycolo• gia* 86: 49-56.

The next issue of the *llfycologistwill* appear in November 1995 and will include articles on:

Fusarium sphaeriae - a Parasite on *Leptosphaeria*

Fungi of St. Catherine's Hill and the need for Conservation

The Coremia of *Penicillium claviforme*

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