

SHORT COMMUNICATION

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Two new species and one new variety of *Oudemansiella* (Agaricales) from Japan

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Abstract Two new species and one new variety of *Oudemansiella* (Agaricales) from Japan are described and illustrated: (1) *Oudemansiella latilamellata* sp. nov. (subgenus *Xerula*, section *Radicatae*) has relatively broad lamellae and broadly ellipsoid spores with a subacute apex; (2) *Oudemansiella rhodophylla* sp. nov. (subgenus *Xerula*, section *Radicatae*), growing in deciduous forests of *Fagus crenata*, *Quercus crispula*, etc., is characteristic in having lamellae tinted reddish; and (3) *Oudemansiella amygdaliformis* var. *bispora* var. nov. (subgenus *Xerula*, section *Albotomentosae*) is distinguished from the type variety by having two-spored basidia and grows in evergreen oak forests (*Castanopsis sieboldii*, *Quercus glauca*, etc.) or bamboo groves.

Key words Agaricales · *Oudemansiella amygdaliformis* var. *bispora* · *Oudemansiella latilamellata* · *Oudemansiella rhodophylla* · Taxonomy

During an investigation of the genus *Oudemansiella* Speng. sensu lato (Singer 1986; Pegler and Young 1987; Yang and Zang 1993) in Japan, the author encountered two new species and one new variety, which are described here.

Before this report, the following nine species of *Oudemansiella* had been reported from Japan [Imazeki and Hongo 1987; Dörfelt 1984, 1986 (as *Xerula*): *O. brunneomarginata* Lj. N. Vassiljeva, *O. canarii* (Jungh.) Höhn., *O. hongoi* (Dörfelt) Zhu L. Yang, *O. japonica* (Dörfelt) Pegler & T.W.K. Young, *O. mucida* (Schrad.: Fr.) Höhn., *O. platyphylla* (Pers.: Fr.) M.M. Moser, *O. pudens* (Pers.) Pegler & T.W.K. Young, *O. radicata* (Relhan: Fr.) Singer, and *O. venosolamellata* (Imazeki & Toki) Imazeki & Hongo. Among them, *O. platyphylla* is now generally segregated into other genera [as *Hydropus platyphyllus*

(Pers.: Fr.) Kühner, *Megacollybia platyphylla* (Pers.: Fr.) Kotl. & Pouz., or *Tricholomopsis platyphylla* (Pers.: Fr.) Singer].

All the specimens cited in this article are preserved in the herbarium of the Natural History Museum and Institute, Chiba, Japan (CBM). For microscopic observations, free-hand sections of dried specimens were rehydrated in 3% KOH and stained with 1% Congo red, if necessary. The central parts of lamellae and pileus were used for microscopy. Color names are indicated by hue, value, and chroma of Munsell's notation, e.g., 5YR4/5 using the color chart of Oyama and Takehara (1973), and the terminology used is mainly based on Vellinga (1988). The following abbreviations are used: Q is length/width ratio of a spore in profile view; Av is average size of measured spores; and *n* is the number of measured spores. Concepts of subgenera and sections used in this article are those of Pegler and Young (1987).

1. *Oudemansiella latilamellata* Mizuta, sp. nov.

Figs. 1,4

Pileo 29–50 mm lato, primo convexo, dein plano, hebetatim luteaurantino, centro parum ruguloso; lamellis usque ad 12 mm latis, albis, adnatis vel adnexis; stipite 40–65 × 4–9 mm, subcylindrico vel sursum subattenuato, basi leviter incrassato, radicato, solido, superne albo, infra apicem fuscido cum squamulis; carne alba; basidiosporis 14.5–19.9 × 12.2–16 μm, late ellipsoideis, apice subacutatis, laevibus, hyalinis; basidiis 53–81 × 12–16 μm, anguste clavatis, bisporis; pleurocystidiis 78–151 × 17–53 μm, sparsis, clavatis, obovatis, subcylindricis vel anguste utrififormibus, fere hyalinis; cheilocystidiis 54–163 × 13–30 μm, copiosis, clavatis vel subfusiformibus apice obtusis, aliquando mucronatis vel subcapitatis, fere hyalinis; hyphis fibulatis in contextu omni praesentibus sed ad lamellas raris.

Holotypus: FB34921 in CBM.

Etymology: *latilamellata* (=with broad lamellae), referring to the fruit body with broad lamellae.

Pileus 29–50 mm in diameter, at first convex, then plane; surface slightly rugulose at disc, dull yellow orange (10YR6/

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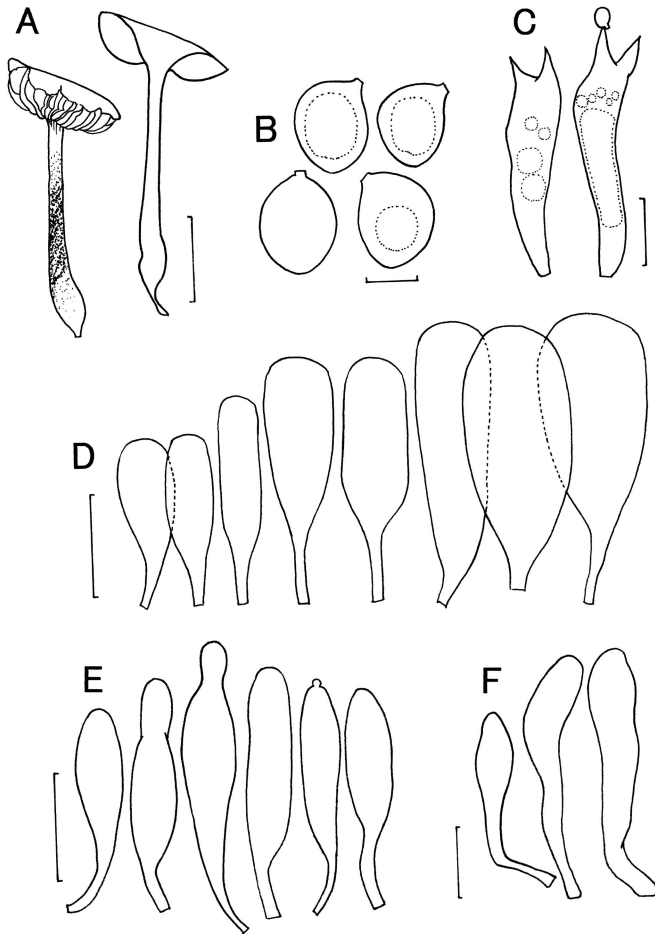


Fig. 1. *Oudemansiella latilamellata*. **A** Fruit body (CBM-FB34921). **B** Basidiospores (CBM-FB34919). **C** Basidia (CBM-FB34921). **D** Pleurocystidia (CBM-FB34919). **E** Cheilocystidia (CBM-FB34919). **F** Caulocystidia (CBM-FB34920). Bars **A** 20mm; **B** 10 μ m; **C**, **F** 20 μ m; **D**–**E** 50 μ m

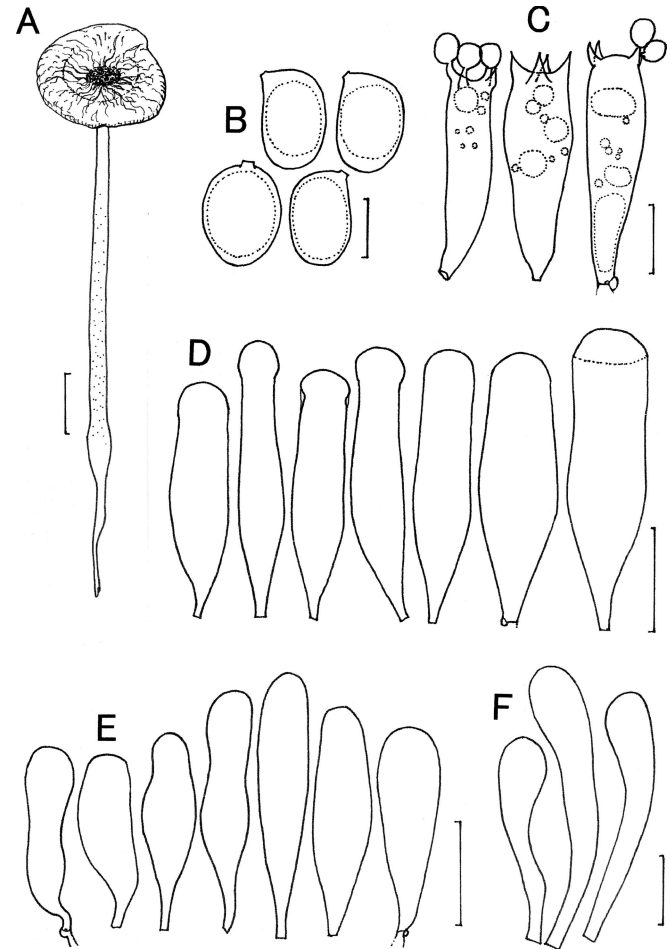


Fig. 2. *Oudemansiella rhodophylla*. **A** Fruit body (CBM-FB34935). **B** Basidiospores (CBM-FB34934). **C** Basidia (CBM-FB34934). **D** Pleurocystidia (CBM-FB34934). **E** Cheilocystidia (CBM-FB34934). **F** Caulocystidia (CBM-FB34935). Bars **A** 20mm; **B** 10 μ m; **C**, **F** 20 μ m; **D**–**E** 50 μ m

4). Lamellae up to 12mm broad, white, adnate to adnexed, subdistant, entire. Stipe 40–65 \times 4–9mm, subcylindrical or somewhat attenuating upward, somewhat enlarged at base, with a short pseudorhiza, solid; surface white in upper part, otherwise dark brown (7.5YR3/3) with small scales. Context white in pileus and stipe. Taste and odor indistinct.

Basidiospores 14.5–19.9 \times 12.2–16 μ m [$A_v = 17.5 \times 14.3$, $Q = 1.13$ – 1.35 ($n = 40$)], broadly ellipsoid with subacute apex, smooth, hyaline, thin- to thick-walled (up to 1 μ m), usually with a large guttule. Basidia 53–81 \times 12–16 μ m, narrowly clavate, 2-spored (rarely 1-, 3-, and 4-spored), at times with a small clamplike protuberance at base. Pleurocystidia 78–151 \times 17–53 μ m, scattered, subcylindrical to narrowly utriform or clavate to obovoid, with a pedicellate or tapered base, almost hyaline, thin-walled. Cheilocystidia 54–163 \times 13–30 μ m, abundant, clavate to subfusiform with an obtuse apex, at times mucronate or subcapitate, mostly pedicellate, hyaline, thin-walled. Pileipellis is a hymeniderm, composed of narrowly clavate to spheropedunculate cells, 25–94 \times 9–24 μ m, mostly thin-walled, rarely thick-walled (up to 1.7 μ m) at the base, almost hyaline. Hyphae below the pileipellis often with intracellular bright yellowish brown pigment.

Pileocystidia absent. Caulocystidia in fascicles, 39–79(–120) \times 6–15 μ m, narrowly subfusiform to narrowly subclavate, thin-walled, smooth, hyaline to pale yellowish brown with intracellular pigment. Hyphae of the stipitipellis 3–14 μ m wide, longitudinally running, narrowly cylindrical, sometimes branched, smooth, hyaline, thin-walled. Clamped hyphae present in all tissues, but rare in the lamellae.

Habitat: on the rotten wood of *Zelkova serrata* (Thunb.) Makino and on the ground around the decaying trunks of *Z. serrata*.

Distribution: Japan (Tokyo).

Specimens examined: Nikko-cho, Fuchu-shi, Tokyo, June 6, 2003, coll. Yoichi Hoshino; FB34919 (in CBM); FB34920 (in CBM); FB34921 (holotype in CBM).

Japanese name: Hiroha-tsuetake.

Notes: Macroscopically, *O. latilamellata* is characterized by the broad lamellae and the distinct small dark brown scales on the stipe. Microscopically, the broadly ellipsoid spores with a subacute apex and subcylindrical to narrow utriform or clavate to obovoid pleurocystidia with a pedicellate or tapered base are characteristic. It belongs to the section *Radicatae* Cléménçon for the absence of

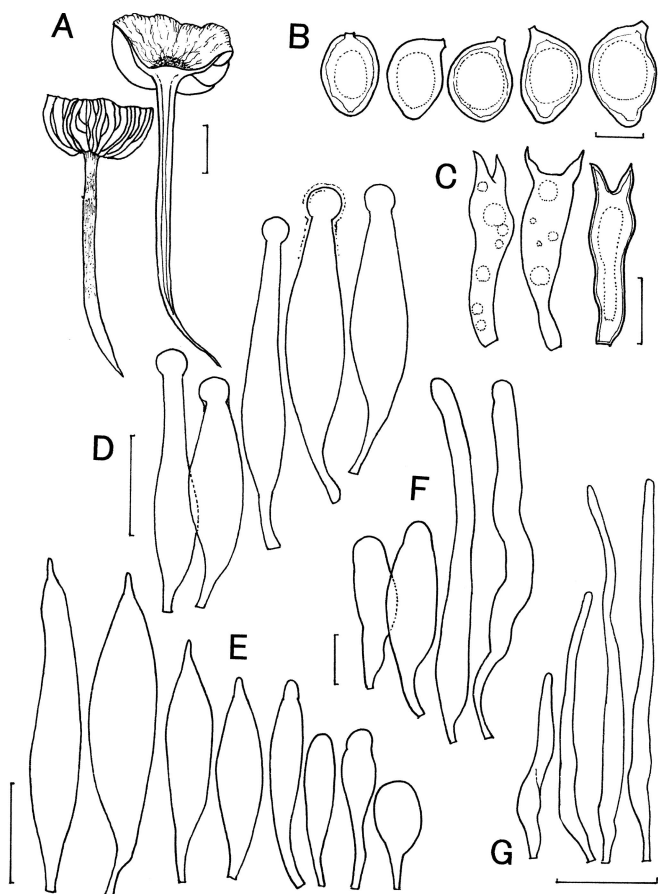


Fig. 3. *Oudemansiella amygdaliformis* var. *bispora*. **A** Fruit body (CBM-FB34937). **B** Basidiospores (CBM-FB34937). **C** Basidia (CBM-FB34937). **D** Pleurocystidia (CBM-FB34936). **E** Cheilocystidia (CBM-FB34937). **F** Caulocystidia (CBM-FB34937). **G** Pileocystidia (CBM-FB34937). Bars **A** 20mm; **B** 10 μ m; **C, F** 20 μ m; **D-E, G** 50 μ m

pileocystidia. This species is similar to *O. hygrophoroides* Singer & Cl  men  on [\equiv *O. radicata* var. *hygrophoroides* (Singer & Cl  men  on) Pegler & T.W.K. Young]. However, *O. hygrophoroides* has distinctly narrower spores [14.5–20.7 \times 7.8–10.3(–11) μ m] and 4-spored basidia (Singer and Cl  men  on 1971). *Oudemansiella radicata* var. *bispora* (Redhead, Ginns & Shoemaker) Zhu L. Yang & M. Zang (Yang and Zang 1993) from North America and Southwest China is also similar, but according to Redhead et al. (1987), the spore size of the North American material is larger, measuring 21–23 \times 14–16 μ m, and it has a glabrous stipe surface.

2. *Oudemansiella rhodophylla* Mizuta, sp. nov.

Figs. 2,5

Pileo 35–63mm lato, primo convexo, dein fere plano, interdum subumbonato, in statu udo viscido, hebetatim luteoaurantino vel hebetatim fulvo, glabro, minute ruguloso, interdum parum striato; lamellis usque ad 7mm latis, incarnatis, adnatis vel adnexis; stipite 80–140 \times 2–8mm, subcylindrico vel sursum leviter angustato, basi

leviter incrassato, radicato, solido deinde fistuloso, apice albo, infra apicem brunneo cum squamulis; carne alba; basidiosporis 15.7–18.8 \times 11.2–12.6 μ m, ellipsoideis, laevibus, hyalinis; basidiis 52–77 \times 11–20 μ m, anguste clavatis vel clavatis, tetrasporis; pleurocystidiis 121–145 \times 26–47 μ m, hyalinis, subcylindricis vel subfusiformibus, apice obtusis vel subcapitatis; cheilocystidiis 57–128 \times 15–25 μ m, hyalinis, clavatis, utriformibus vel subfusiformibus apice obtusis; hyphis fibulatis.

Holotypus: FB34934 in CBM.

Etymology: *rhodophylla* (=rosy-red-leaved), referring to the lamellae more or less tinted rosy-red.

Pileus 35–63mm in diameter, at first convex, then almost applanate, occasionally subumbonate; surface slightly viscid when moist, glabrous, finely rugulose around or at disc, occasionally slightly striate at the pileus margin, dull yellow orange to dull yellowish brown (10YR6/4, 5/4). Lamellae more or less reddish [light reddish gray (2.5YR7/1, 7/2), light gray (5YR8/2)], adnate to narrowly adnate (or adnexed), subdistant to subcrowded, entire, up to 7mm broad. Stipe 80–140 \times 2–8mm, subcylindrical or somewhat attenuating upward, somewhat enlarged at the base, with a pseudorhiza, solid then hollow; surface white at apex, brownish with minute scales below. Context white in pileus and stipe. Taste and odor indistinct.

Basidiospores 15.7–18.8 \times 11.2–12.6 μ m [Av = 16.9 \times 11.7 μ m, Q = 1.34–1.54 ($n = 20$)], ellipsoid, smooth, hyaline, thin-walled, usually with a large guttule. Basidia 52–77 \times 11–20 μ m, narrowly clavate to clavate, 4-spored (rarely 2- or 3-spored), clamped at base. Pleurocystidia 121–145 \times 26–47 μ m, scattered, subcylindrical to subfusiform, with a short pedicel, hyaline, thin-walled; apex obtuse to subcapitate, with pale yellowish brown mucoid deposits. Cheilocystidia 57–128 \times 15–25 μ m, abundant, clavate, utriform or subfusiform, apex obtuse, often with a short pedicel, hyaline, thin-walled. Pileipellis a hymeniderm, composed of narrowly clavate to spheropedunculate cells, 34–86 \times 11–31 μ m, with bright yellowish brown contents. Pileocystidia absent. Caulocystidia in fascicles, 38–112 \times 9–18 μ m, subclavate, thin-walled (up to 1 μ m), hyaline to pale yellowish brown with intracellular pigment. Hyphae of stipitipellis 2–14 μ m wide, longitudinally oriented, cylindrical, sometimes branched, almost hyaline, thin-walled. Clamps present in tissues. Yellow to yellowish brown pigments scattered in tissues of the lamellae.

Habitat: on the ground in forests of *Fagus crenata* Blume, *Quercus crispula* Blume, etc.

Distribution: Japan (Hyogo, Oita and Kumamoto Prefs.).

Specimens examined: Onzui Valley, Haga-cho, Shiso-gun, Hyogo Prefecture, Sept. 21, 2002, coll. members of Hyogo Kinoko Kenkyukai, FB34922 (in CBM); Kurodake forest in Aso Kujyu National Park, Syonai-cho, Oita Prefecture, Aug. 2, 2003, coll. Eiji Hadano, FB34933 (in CBM); loc. cit., Aug. 16, 2003, coll. Eiji Hadano, FB34934: holotype (in CBM); Tankaino Natural Forest Park, Itsuki-mura, Kuma-gun, Kumamoto Prefecture, Sept. 7, 2003, coll. members of Kumamoto Kinoko Kai, FB34935 (in CBM).

Japanese name: Akaha-tsuetake.

Figs. 4–6. 4 Fruit bodies of *Oudemansiella latilamellata* [CBM-FB34919 (*left*), CBM-FB34920 (*center*), CBM-FB34921 (*right*)]. 5 Fruit body of *Oudemansiella rhodophylla* (CBM-FB34933). 6 Fruit body of *Oudemansiella amygdaliformis* var. *bispora* (CBM-FB34937). Bars 10mm



Notes: This species belongs to the section *Radicatae* for the absence of pileocystidia. It is characterized by having slightly reddish-tinted lamellae and a comparatively slender stipe. The reddish tone of the lamellae may be caused by scattered pigments in tissues of lamellae and the mucoid deposits on the apex of pleurocystidia. The mucoid deposits on pleurocystidia are recognizable under the stereomicroscope. *Oudemansiella rhodophylla* is similar to *O. radicata*, but the latter has white lamellae and a glabrous stipe surface (Pegler and Young 1987). Microscopically, most characteristics are nearly identical in both species except that *O. rhodophylla* has yellow to yellowish brown scattered pigment in tissues of the lamella and similarly colored mucoid deposits at the apex of pleurocystidia.

3. *Oudemansiella amygdaliformis* Zhu L. Yang & M. Zang var. *bispora* Mizuta, var. nov.

Figs. 3,6

A typo differt basidiis bisporis.

Holotypus: FB34937 in CBM.

Etymology: *bispora* (=two-spored). Referring to the two-spored basidia.

Pileus 25–46mm in diameter, almost convex, often reflexed at the margin; surface viscid, radially rugulose at disc, minutely wrinkled at the pileus margin, dull yellowish brown to dull yellow orange (10YR5/4, 6/3, 7/2) or dark brown (10YR4/3, 3/3) at disc. Lamellae white, adnate to adnexed, subdistant, entire, up to 7mm broad. Stipe 26–75 ×

3–7 mm, subcylindrical or attenuating upward, somewhat enlarged at the base, hollow, with pseudorhiza; surface white at apex, otherwise dull yellowish brown to dark brown (10YR5/3, 3/3) with minute scales. Context white in pileus and stipe. Taste and odor indistinct.

Basidiospores $13.8\text{--}20.6 \times 9\text{--}14 \mu\text{m}$ [$Av = 17.1 \times 12$, $Q = 1.2\text{--}1.71$ ($n = 80$)], broadly ellipsoid with subacute apex to amygdaliform, often lemoniform in profile view, smooth, hyaline, slightly thick- to thick-walled (up to $1.5 \mu\text{m}$), usually with a large guttule. Basidia $36\text{--}64 \times 12\text{--}19 \mu\text{m}$, clavate, 2-spored (rarely 1-, 3-, and 4-spored), thin- to thick-walled (up to $2 \mu\text{m}$), occasionally with small protuberance like a clamp at base. Pleurocystidia $90\text{--}190 \times 18\text{--}39 \mu\text{m}$, scattered, fusiform, often with a long neck, subcapitate or capitate, with a pedicellate or tapered base, hyaline, thin-walled, occasionally with pale yellow to pale yellowish green mucoid deposits at the apex. Cheilocystidia $34\text{--}183 \times 10\text{--}36 \mu\text{m}$, abundant, subfusiform, with an obtuse to acute apex, occasionally mucronate or rostrate, or subclavate, with a pedicellate base, hyaline, thin-walled. Pileipellis hymeniform, composed of clavate to spheropedunculate cells, $25\text{--}75 \times 10\text{--}30 \mu\text{m}$, thin-walled, with bright yellowish brown to brown intracellular pigment, intermixed with pileocystidia. Pileocystidia scattered or somewhat crowded, $65\text{--}295 \times 7\text{--}15 \mu\text{m}$, lanceolate to elongate-conical, thin-walled, with almost hyaline to dull yellow orange with intracellular pigment. Caulocystidia $45\text{--}163(\text{--}225) \times 8\text{--}21 \mu\text{m}$, elongate-conical, flexuose or subfusiform with an obtuse apex, pedicellate, thin-walled, hyaline to pale yellowish brown with intracellular pigment. Hyphae of stipitipellis $3\text{--}15 \mu\text{m}$ wide, longitudinally oriented, cylindrical, almost hyaline, thin-walled. Clamped hyphae present in all tissues but rare in the lamellae.

Habitat: on the ground in evergreen oak forests [*Castanopsis sieboldii* (Makino) Hatus. ex T. Yamaz. et Mashiba, *Quercus glauca* Thunb. ex Murray, etc.] and in bamboo groves.

Distribution: Japan (Chiba, Yamaguchi, and Hyogo Prefs.).

Specimens examined: Kenritu Boso Fudoki no Oka, Sakae-cho, Inba-gun, Chiba Prefecture, Sept. 28, 2002, coll. unknown, FB34936 (in CBM); Mt. Iwaki, Yamato-cho, Kumage-gun, Yamaguchi Prefecture, June 15, 2003, coll. members of Yamaguchi Naba no Kai, FB34937: holotype (in CBM); Yamada-cho, Kita-ku, Kobe-shi, Hyogo Prefecture, June 20, 2003, coll. Mitsuo Nabe, FB34938 (in CBM).

Japanese name: Futami-togarimi-tsuetake.

Notes: *Oudemansiella amygdaliformis* var. *bispora* is characterized by the almond-shaped spores and two-spored basidia, and the spores and basidia are often thick-walled. It is similar to the type variety, but var. *amygdaliformis* has 4-

spored basidia (Yang and Zang 1993). The following four species have been reported to have 2-spored basidia in *Oudemansiella* (= *Xerula*): *O. altissima* (Masse) Corner (Corner 1994), *O. bii* Zhu L. Yang & Li F. Zhang (Yang and Zhang 2003), *O. bispora* (Natarajan & Purush.) Zhu L. Yang & Li F. Zhang (Yang and Zhang 2003), and *X. radicata* var. *mundroola* Grgur. (Grgurinovic 1997). However, spore shape of the four species already described here is subglobose to broadly ellipsoid, differing from *O. amygdaliformis* var. *bispora*, which has almond-shaped spores.

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References

- Corner EJH (1994) On the agaric genera *Hohenbuehelia* and *Oudemansiella*. Part 2: *Oudemansiella* Speg. Gdns Bull Singapore 46:49–75
- Dörfelt H (1984) Taxonomische Studien in der Gattung *Xerula* R. Mre. (IX). Feddes Repertorium 95:189–200
- Dörfelt H (1986) Taxonomische Studien in der Gattung *Xerula* R. Mre. (XI). Feddes Repertorium 97:397–404
- Grgurinovic CA (1997) Larger fungi of South Australia. The Botanic Gardens of Adelaide and State Herbarium and The Flora and Fauna of South Australia Handbooks Committee, Adelaide, pp 252–253
- Imazeki R, Hongo T (1987) Colored illustrations of mushrooms of Japan, vol I. Hoikusha, Osaka
- Oyama M, Takehara H (1973) Revised standard soil color charts, 4th edn. Japan Color Enterprise, Tokyo
- Pegler DN, Young TWK (1987) Classification of *Oudemansiella* (Basidiomycota: Tricholomataceae), with special reference to spore structure. Trans Br Mycol Soc 87:583–602
- Redhead SA, Ginns J, Shoemaker RA (1987) The *Xerula* (*Collybia*, *Oudemansiella*) *radicata* complex in Canada. Mycotaxon 30:357–405
- Singer R (1986) The Agaricales in modern taxonomy, 4th rev edn. Koeltz Scientific Books, Koenigstein
- Singer R, Cléménçon H (1971) Neue Arten von Agaricales. Schweiz Z Pilzk 49:118–128
- Vellinga EC (1988) Glossary. In: Bas C, Kuyper TW, Noordeloos ME, Vellinga EC (eds) Flora Agaricina Neerlandica, vol 1. Balkema, Rotterdam, pp 54–64
- Yang ZL, Zang M (1993) Classification of the genus *Oudemansiella* Speg. in Southwest China. Acta Mycol Sin 12:16–27
- Yang ZL, Zhang LF (2003) Type studies on *Clitocybe macrospora* and *Xerula furfuracea* var. *bispora*. Mycotaxon 88:447–454