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Russula viridicinnamomea F. Yuan & Y. Song, sp. nov. and *R. pseudocatillus* F. Yuan & Y. Song, sp. nov., two new species from southern China

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ABSTRACT
Two novel species of *Russula* Pers. subgenus *Heterophyllidia* Romagnesi, collected from the Dinghushan Biosphere Reserve in southern China, are described and illustrated based on both morphological and phylogenetic analyses of the internal transcribed spacer (ITS) sequences. *Russula viridicinnamomea* F. Yuan & Y. Song, sp. nov. is characterized by the emerald green-tinged buff pileus with undulate and tearing margin, lamellae that are frequently forked, subreticulate basidiospores with interconnected warts, very thick pileipellis with terminal elements that are often inflated to subglobose, and abundant hymenial cystidia and dermatocystidia, all changing to dark grey in sulphovanillin. *Russula pseudocatillus* F. Yuan & Y. Song, sp. nov. shows close relationship to *Russula catillus* Lee, Park & Lim, but it differs from the latter by its smaller basidiomata and pleurocystidia, irregular presence of lamellulae, much bigger basidiospores ornamented with higher warts never forming a reticulum, and not gelatinized pileipellis. Both morphological and molecular analyses consistently confirm the distinctiveness of these two novel taxa in subgenus *Heterophyllidia*. The differences among two novel taxa and their related species are discussed.

KEY WORDS
Dinghushan Biosphere Reserve,
Russula subg. *Heterophyllidia*,
biodiversity,
phylogeny,
new species.

RÉSUMÉ

Russula viridicinnamomea *F. Yuan & Y. Song, sp. nov. and* R. pseudocatillus *F. Yuan & Y. Song, sp. nov., deux nouvelles espèces de la Chine du Sud.*

Deux espèces nouvelles du genre *Russula* Pers., récoltées dans la Réserve Biosphère du Dinghushan, Chine du Sud, sont décrites sur des critères morphologiques et phylogénétiques (analyse des séquences ITS), les plaçant toutes deux dans le sous-genre *Heterophyllidia* Romagnesi. *Russula viridicinnamomea* F. Yuan & Y. Song, sp. nov. possède un chapeau d'un vert émeraude, des lames souvent fourchues, des basidiospores subréticulées et un pileipellis épais avec des terminaisons composées de cellules typiques, enflées à subglobuleuses et mélangées à d'abondantes dermatocystides réagissant à la sulphovanilline. *Russula pseudocatillus* F. Yuan & Y. Song, sp. nov. est proche de *R. catillus* Lee, Park & Lim, mais en diffère par la taille inférieure des carpophores et des pleurocystides, la présence irrégulière de lamellules, ses basidiospores plus grandes et à ornementation plus haute, jamais réticulée et par son pileipellis non gélifié.

MOTS CLÉS

Réserve Biosphère du Dinghushan, *Russula* sous-genre *Heterophyllidia*, biodiversité, phylogénie, espèces nouvelles.

INTRODUCTION

The genus *Russula* Pers., erected by Persoon in 1796, is one of the most highly diverse groups of macrofungi with a cosmopolitan distribution from the arctic tundra to tropical forests (Buyck 1989; Buyck *et al.* 1996, 2008, 2015; Miller & Buyck 2002; Park *et al.* 2013). Over 2500 names and 750 species have been recorded according to Index Fungorum since the establishment of the genus (Kirk *et al.* 2008). *Russula* is a group of gilled mushrooms with brightly coloured pileus and fragile basidiocarps that do not excude latex. All members of *Russula* are obligatory root-mutualistic species which can form ectomycorrhiza with diverse plants, playing important ecological roles in sustaining forest biodiversity and as nutrient sources for some animals (Fogel & Trappe 1978; Yamashita & Hijii 2007). Recently, Buyck *et al.* (2018) demonstrated that the anatomy of ectomycorrhiza added support to a new infrageneric classification system of *Russula* based on a new multi-locus analysis of five house-keeping genes, which was followed in this study.

The Dinghushan Biosphere Reserve (DHSBR, 112°30'39"-112°33'41"E, 23°09'21"-23°11'30"N) is located in Guangdong Province, southern China, and has a subtropical monsoon climate. It is one of three Chinese reserves selected in 1980 to join the Biosphere Reserve Network of the United Nations Educational, Scientific and Cultural Organization (UNESCO) for its unique geographic position and ecological importance (Bi & Li 1986; Zheng *et al.*). A thorough survey for Russulaceae was carried out by the authors in DHSBR since 2014. As a result, eight new species and one epitype of *Russula* (Das *et al.* 2017; Zhang *et al.* 2017; Song *et al.* 2018a,b), two new species of *Lactarius* (Wang *et al.* 2018) and three new species and one new variety of *Lactifluus* (Song *et al.* 2017, 2018c; Zhang *et al.* 2016) have been published. In this study, two additional novel *Russula* species, *R. viridicinnamomea* F. Yuan & Y. Song, sp. nov. and *R. pseudocatillus* F. Yuan & Y. Song, sp. nov., are proposed based on both morphological and phylogenetic analyses.

MATERIAL AND METHODS

Sampling and morphology

Specimens were collected during macrofungal survey from September 2015 to April 2016 at the Dinghushan Biosphere Reserve (DHSBR, 112°30'39"-112°33'41"E, 23°09 Holotype. — CHINA. Guangdong Province, Zhaoqing City, Dinghu Mountain, 14 September 2016, J. W. Li K16042406 (GDGM 75338, holotype). 21"-23°11'30"N), Guangdong Province, southern China. All specimens were dehydrated at 50-60 °C and deposited in the Herbarium of Microbiology Institute of Guangdong (GDGM). Fresh basidiomata were photographed using a Canon IXUS 220 hs digital camera under daylight in the field, and macroscopic characteristics were recorded. Macromorphological descriptions are based on the field notes and photographs taken from fresh basidiomata. Microscopic characters were observed under a Nikon Eclipse Ni-U microscope from hand-sectioned dried materials. Scanning electron images of basidiospores were captured with a Field Emission Scanning Electronic Microscope (JSM-6330F). Basidiospores were examined in Melzer's reagent and measured in side view, excluding ornamentations. The other micromorphological structures (basidia, hymenial cystidia, dermatocystidia, elements of pileipellis and stipitipellis) were observed from hand-sectioned dried tissues rehydrated in 5% KOH solution and then mounted with 1% aqueous Congo red reagent. All tissues were examined in cresyl blue (Buyck 1989) to verify presence of ortho- or metachromatic reactions. Sulphovanillin (SV) was used to test color reactions of cystidia (Sarnari 1998). Descriptive terminology followed Vellinga (1988). Color designation refers to HTML Color Codes (https://htmlcolorcodes.com). The abbreviation [x/y/z] indicates that measurements were made on x basidiospores in y basidiomata from z collections. Basidiospore size and length/width ratio (Q) are given in the form of (a-) b-m-c (-d). The range b-c contains 95% of the measured values, a and d refer to the extremes of all measurements, and m means average value. The infrageneric classification follows Buyck *et al.* (2018).

DNA extraction, PCR, sequencing and phylogenetic analyses

For molecular phylogenetic analysis, genomic DNA was extracted from fresh fruit-bodies using a modified CTAB procedure of Doyle & Doyle (1987). ITS region 1 and 2, and the 5.8S rDNA were amplified using primer pair ITS1 and ITS4 (White *et al.* 1990). The amplification protocol consisted of a 5 min activation at 94°C, followed by 32 cycles of 30 s at 52°C and 1 min at 72°C, and a final 12 min extension at 72°C. PCR products were purified using E.Z.N.A Gel Extraction Kit (OMEGA) and sequenced on an ABI3730xl DNA Analyzer (IGE, Guangzhou, China) using primers identical to PCR. The newly generated sequences were deposited in GenBank (www.ncbi.nlm.nih.gov).

Blast query in GenBank with newly generated ITS sequences showed that the proposed two novel species were assigned to *Russula* subg. *Heterophyllidia* Romagnesi. To exactly verify their taxonomic positions, maximum likelihood (ML) analysis based on rDNA ITS matrix was performed using RAxML 7.2.6 (Stamatakis 2006). A dataset composed of 95 ITS sequences of *Russula* was used in the phylogenetic analysis. *Russula archaea* R. Heim and *R. camarophylla* Romagnesi in subg. *Archaea* Buyck & V. Hofst., *R. densifolia* Secr. ex Gillet and *R. nigricans* Fries in subg. *Compactae* (Fr.) Bon, emend. Buyck & V. Hofst. in Hongsanan et al., as well as *R. emetica* (Schaeff.) Pers. and *R. lepida* Fries in subg. *Russula* were chosen as outgroups. The dataset was automatically aligned by Clustal W, then manually adjusted and trimmed with BioEdit v7.0.9 (Hall 1999). The final alignment comprised 792 characters including gaps. A rapid bootstrapping (BS) algorithm of 1000 replicates was executed in RAxML, followed by a heuristic ML search for the best tree using the GTRGAMMA model. All parameters in RAxML analysis were kept at default, bootstrap value (BS) exceeding 70% was considered significantly supported.

RESULTS

Phylogenetic analyses

The resulting ML phylogram is shown in Figure 1. In the phylogram, both subg. Heterophyllidia sect. *Heterophyllae* Fr. and *Ingratae* (Quél.) Maire formed significantly supported monophyletic clades.

Russula viridicinnamomea F. Yuan & Y. Song, sp. nov. clustered with the Chinese *R. bubalina* J. W. Li & L. H. Qiu and *R. pseudobubalina* J. W. Li & L. H. Qiu to form a highly resolved (BS = 100%) clade. Together, these three species clustered with the European *R. vesca* Fr. and *R. heterophylla* Fr., the American *R. brunneola* Burl. and the recently described Chinese *R. subatropurpurea* J.W. Li and L.H. Qiu to form another strongly resolved clade (BS = 100%) that corresponds to subsect. *Heterophyllae* (Fr.) Jul. Schäff.

The ITS sequence of *R. viridicinnamomea* F. Yuan & Y. Song, sp. nov. is only 93.5% similar with the one for *R. bubalina*, and 92.8% with the ITS of *R. pseudobubalina*.

Russula pseudocatillus F. Yuan & Y. Song, sp. nov. was part of a well-resolved clade (BS = 97%) comprising several dark brown to grayish brown species within sect. *Ingratae*, but its closest relative is not resolved. Sequence similarity with the ITS of the Korean *R. catillus* H. Lee, M.S. Park & Y.W. Lim is 96.5%.

TAXONOMY

Russula viridicinnamomea F. Yuan & Y. Song, sp. nov. (Figs 2, 3)

Mycobank number: MB 828267

Systematic position. — Basidiomycota, Agaricomycetes, Russulales, Russulaceae, *Russula* subg. *Heterophyllidia* subsect. *Heterophyllae*.

Holotype. — **China**. Guangdong Province, Zhaoqing City, Dinghu Mountain, on the ground in broad-leaf forest, 14.IX.2015, *J. B. Zhang K15091418* (holo-, GDGM[GDGM 75339]).

Etymology. — Referring to the green tinged buff pileus.

Diagnosis. — *R. viridicinnamomea* F. Yuan & Y. Song, sp. nov. is mainly characterized by sequence data for the internal transcribed spacers (ITS), its green tinged cinnamon pileus with undulate and easily peeling margin, absence of lamellulae, basidiospores with partially reticulate ornamentations, gloeocystidia changing to grey in SV and thick pileipellis often with inflated subterminal cells.

Habitat and distribution. — Gregarious in evergreen broad-leaf forest.

Additional specimens examined. — **China**. Guangdong Province, Zhaoqing City, Dinghu Mountain, on the ground in broad-leaf forest, 14.IX.2015, *J. B. Zhang K15091418-1*, (GDGM[GDGM 75340]).

Description

Basidiomata

Small to medium sized, agaricoid.

Pileus

3-5 cm in diam., hemispherical when young, becoming applanate when mature, with entire margin; surface easy to peel to mid-radius, glabrous, dry, not viscid, pale green (#98FB98), with center a very pale greenish-grayish yellow (palegoldenrod, #EEE8AA).

Lamellae

Adnate, equal, rarely forked, off-white (white smoke, #F5F5F5), unchanging when bruised; edge even, concolorous; lamellulae present, but rare.

Stipe

3-4.5 × 0.7-1 cm, central, cylindrical, solid; surface dry, off-white (white smoke, #F5F5F5), longitudinally rugulose.

Context

Off-white (ghost white, #F8F8FF), 1-3 mm thick, unchanging when bruised.

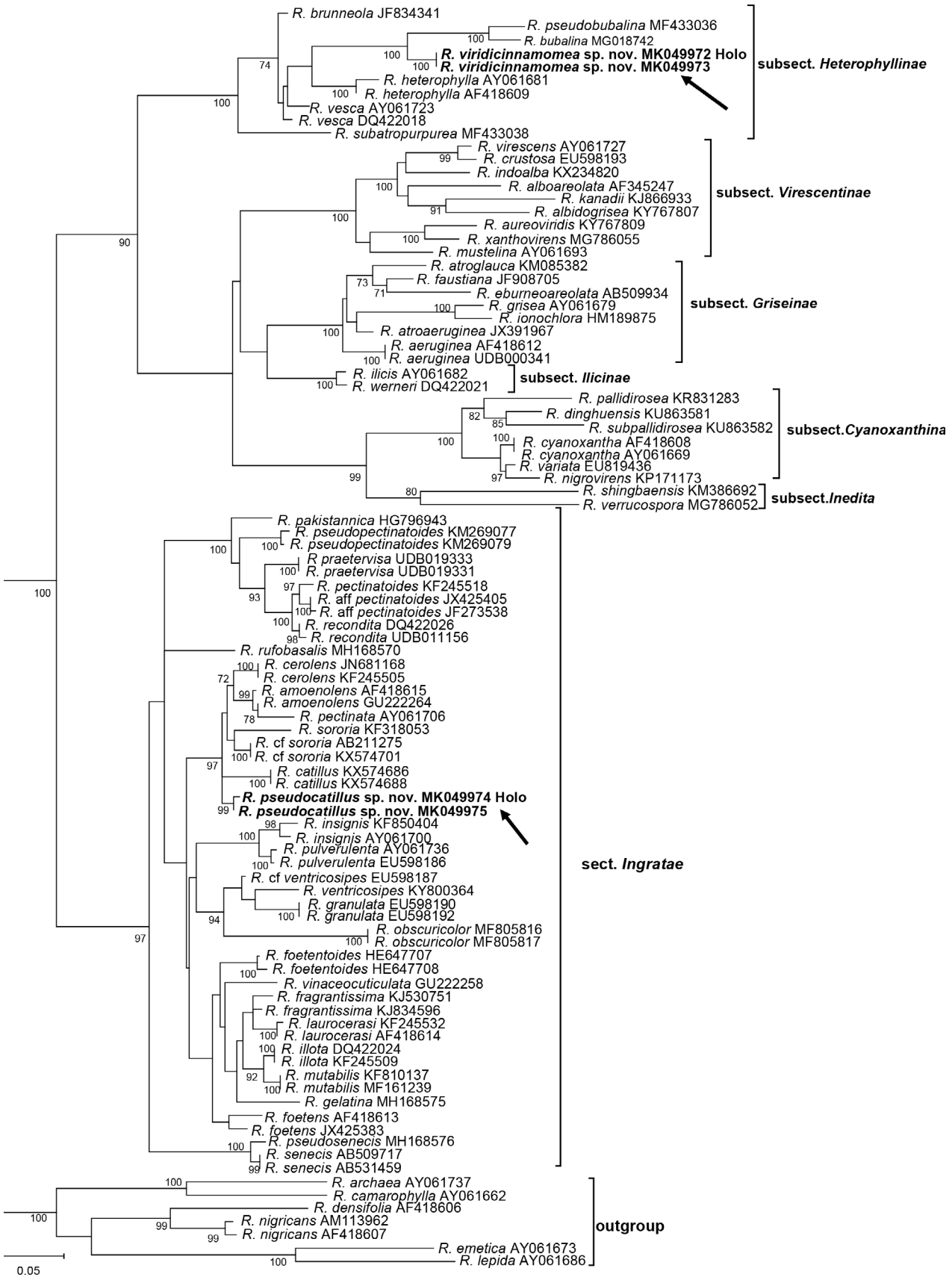

Fig. 1. — Maximum-likelihood tree of *Russula* subg. *Heterophyllidia* based on ITS sequences performed by RAxML. Bootstrap values higher than 70% are shown, two novel species are shown in bold.

FIG. 2. — *Russula viridicinnamomea* F. Yuan & Y. Song, sp. nov.: K15091418 (GDGM 75339, holotype). **A**, **B**, Fruiting bodies; **C**, Pileipellis; **D**, Terminal elements of pileipellis; **E** ,**F**, Scanning electronic micrographs of basidiospores. Scale bars: A-B, 1 cm; C, 100 µm; D, 10 µm; E-F, 1 µm.

Odour
Indistinct.

Taste
Mild.

Spore print
Whitish.

Basidiospores
Subglobose to ellipsoid, [80/4/2] (5.1-) 5.3-6.1-7.0 (-8.1) ×(3.6-) 4.2-4.7-5.5 (-5.8)µm, Q = (1.05-) 1.12-1.30-1.47 (-1.68), hyaline in 5% KOH; ornamentations amyloid, composed of verrucose to conical warts up to 0.6 µm, linked by fine lines forming incomplete network, intermixed with isolated warts; suprahilar spot not amyloid.

Basidia
31-45.5 × 8.5-11.5 µm, clavate to subcylindrical, 4-spored, rarely 2- or 3-spored, some containing oil droplets when young; sterigmata up to 7 µm long.

Lamellar trama
Composed of nested sphaerocytes surrounded by connective hyphae.

Pleurocystidia
31.5-66 × 4.5-13.5 µm, abundant, fusoid to cylindrical, with rostrate or mucronate apices, thin-walled, with abundant granular contents, becoming dark grey in sulphovanillin (SV).

Cheilocystidia
36.5-63 × 4-12 µm, cylindrical, with capitate apex, thin-walled, some with refractive granular contents, becoming dark grey in SV.

Marginal cells
Not differentiated.

Pileipellis
Orthochromatic in cresyl blue, divided into an upper trichodermal suprapellis and an underlying subpellis of slender, repent to ascending hyphae. Subpellis 350-450 µm deep, composed of septate, thin-walled, hyaline hyphae. Suprapellis 50-80 µm thick, composed of ascending to erect, densely septate hyphal extremities, often with progressively inflating subterminal cells; terminal cells subcylindrical or more frequently distinctly narrowing upward, with obtuse apices; chains of subterminal cells mostly progressively inflated, with more basal cells mostly ellipsoid to subglobose.

Pileocystidia
Abundant, mostly 20.5-84 × 3-6 µm, one-celled, terminal on extremities, narrowly clavate to cylindrical in suprapellis, apex rostrate or obtuse, with granular refractive contents, becoming longer and cylindrical in subpellis, without septa and with distinct refractive contents changing to dark grey in SV.

Stipitipellis
A cutis, orthochromatic in cresyl blue, composed of repent, thin-walled, septate hyphae up to 4.6 µm broad; terminal cells cylindrical.

Caulocystidia
Frequent, cylindrical, mostly 18.5-54 × 3-13 µm, with obtuse apices, without septa, with refractive contents, turning dark grey in SV.

Stipe trama
Composed of connective hyphae and nested sphaerocytes.

Clamp connections
Absent.

Notes
The combination of predominantly equal gills, pale spore print, absence of an amyloid suprahilar spot, no primordial hyphae, but presence of single-celled gloeocystidia and well-differentiated hyphal extremities are all characters that suggest that *R. viridicinnamomea* F. Yuan & Y. Song, sp. nov. belongs in subg. *Heterophyllidia*. Our phylogenetic analysis based on ITS sequences placed it firmly within sect. *Heterophyllae*, subsect. *Heterophyllae*, where it is closely related to *R. bubalina* and *R. pseudobubalina* (Li *et al.* 2018). The latter subsection was traditionally based on the European *R. vesca* and *R. heterophylla*, two species that produce a strong carrot orange reaction to $FeSO_4$ (which has not yet been verified for our species) and are both unique among European *Russulas* in possessing thick-walled, needle-shaped cells at the surface of the pileipellis, particularly near the pileus center. Both of these characters have not yet been reported for any of the Chinese species that were recently attributed to this group, except for the confirmed strong reaction to $FeSO_4$ in *R. pseudobubalina* and *R. subatropurpurea* (Li *et al.* 2018). Whereas the three Chinese species that were recently attributed to this subsection are all similar to *R. vesca* in general color, viz. mostly in shades of pink to pinkish brown with local discolored spots that are yellowish rusty in color, *R. viridicinnamomea* F. Yuan & Y. Song, sp. nov. is more reminiscent of *R. heterophylla* because of the green shades on the pileus.

Russula pseudocatillus F. Yuan & Y. Song, sp. nov.
(Figs 4, 5)

Mycobank number: MB 828268

Systematic position. — Basidiomycota, Agaricomycetes, Russulales, Russulaceae, *Russula* subg. *Heterophyllidia* sect. *Ingratae*.

Holotype. — **China**. Guangdong Province, Zhaoqing City, Dinghu Mountain, 14.IX.2016, *J. W. Li K16042406,* (holo-, GDGM[GDGM 75338]).

Etymology. — Named for its resemblance to *R. catillus* in pileus morphology.

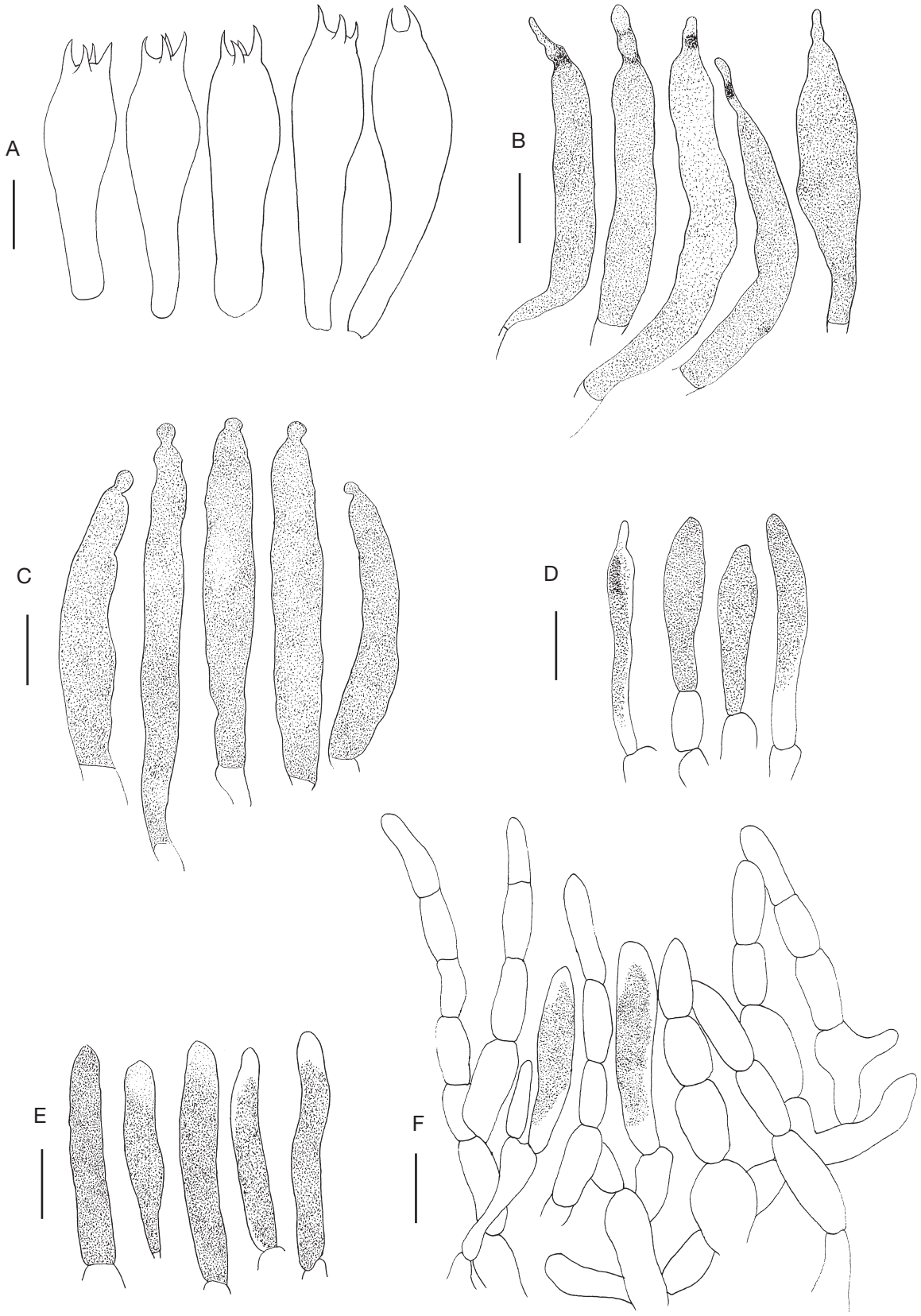

Fig. 3. — *Russula viridicinnamomea* F. Yuan & Y. Song, sp. nov. K15091418 (GDGM 75339, holotype). **A**, Basidia; **B**, Pleurocystidia; **C**, Cheilocystidia; **D**, Pileocystidia; **E**, Caulocystidia; **F**, Pileipellis. Scale bars: 10 µm.

Fig. 4. — *Russula pseudocatillus* F. Yuan & Y. Song, sp. nov.: K16042406 (GDGM 75338, holotype). **A**, **B**, fruiting bodies; **C**, **D**, Terminal elements of pileipellis; **E**, **F**, Scanning electronic micrographs of basidiospores. Scale bars: A, B, 1 cm; C, D, 10 µm; E, F, 1 µm.

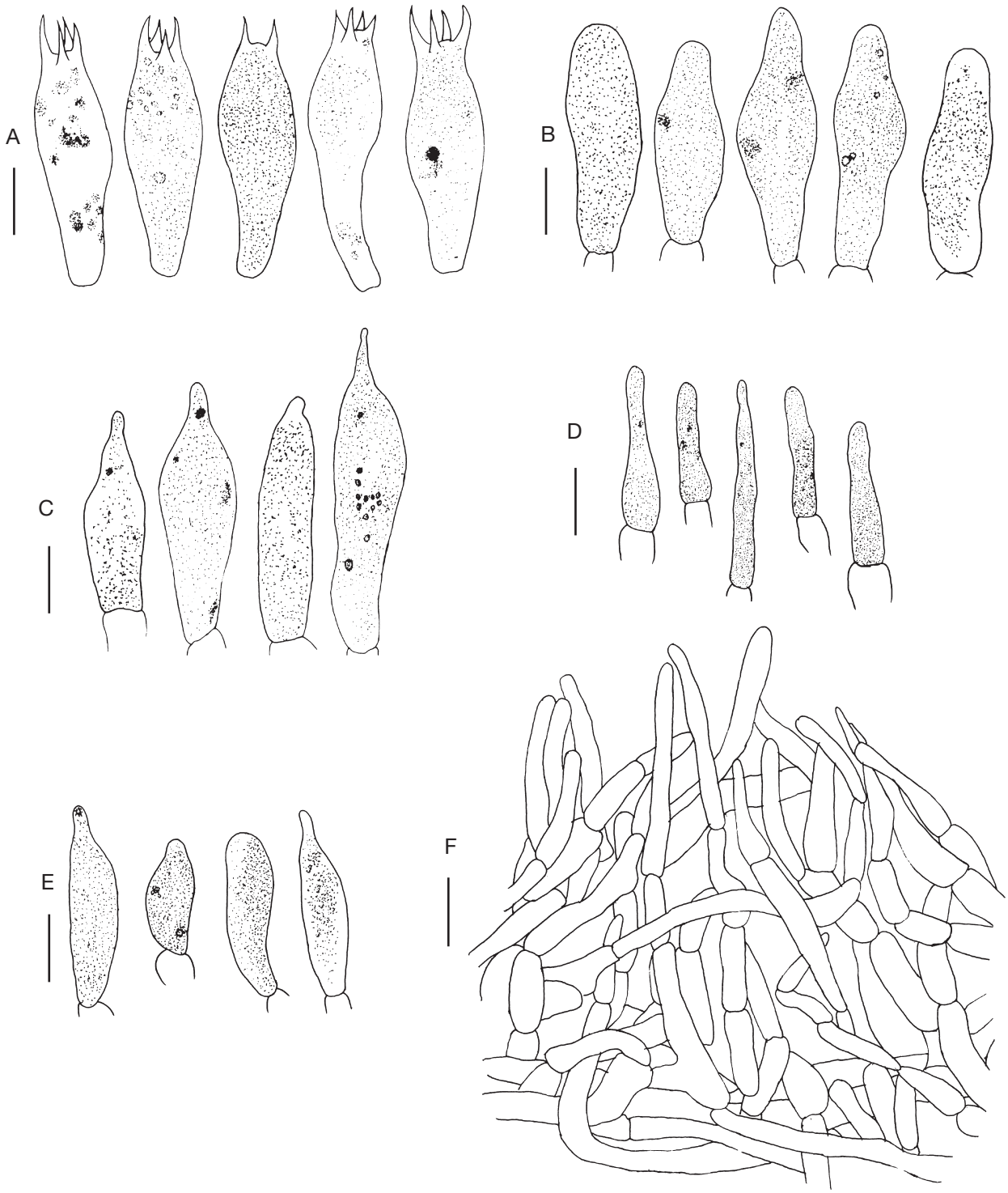

FIG. 5. — *Russula pseudocatillus* F. Yuan & Y. Song, sp. nov.: K16042406 (GDGM 75338, holotype): **A**, Basidia; **B**, Pleurocystidia; **C**, Cheilocystidia; **D**, Pileocystidia; **E**, Caulocystidia; **F**, Pileipellis. Scale bars: 10 µm.

DIAGNOSIS. — *R. pseudocatillus* F. Yuan & Y. Song, sp. nov. resembles *R. catillus* in overall pileus morphology, but it differs from the latter by its smaller basidiomata, presence of lamellula, much bigger basidiospores ornamented with higher warts never forming a reticulum, presence of dermatocystidia (pileocystidia and caulocystidia), smaller pleurocystidia and not gelatinized pileipellis.

HABITAT AND DISTRIBUTION. — Gregarious in evergreen broadleaf forest.

ADDITIONAL SPECIMENS EXAMINED. — **China**. Guangdong Province, Zhaoqing City, Dinghu Mountain, 7.VI.2015, *J. B. Zhang K15060706*.

Description

Basidiomata
Small, agaricoid.

Pileus
2.5-4 cm in diam., plano-concave or applanate with a depressed center, some slightly decurrent, surface glabrous, slightly viscid when wet, very pale yellow (corn silk, #FFF8DC) at margin, with a pale greyish brown (tan, #D2B48C) center; margin slightly undulate, striate, rarely cracked.

Lamellae
Adnate, subequal, interveined, often forked near stipe, about 2 mm in height, very pale grayish yellow (beige, #F5F5DC), unchanging when bruised; edge entire, concolorous; lamellulae rather frequent, but not polydymous.

Stipe
2.5-4 × 0.6-1 cm, central, cylindrical, sometimes slightly tapering upwards, surface dry, slightly longitudinally rugulose, a pale greenish-grayish yellow (goldenrod, #EEE8AA) in the upper part, burlywood at the bottom, stuffed at first, becoming hollow when old.

Context
Off-white (ivory, #FFFFF0), unchanging when bruised.

Odour
Indistinct.

Taste
Mild.

Spore print
Very pale.

Basidiospores
Broadly ellipsoid to subglobose, [40/2/2] 7.0-7.9-8.6 (-9.2) × (5.1- (5.5-6.1-6.6 (-6.7) µm, Q = (1.19-) 1.22-1.32-1.42, hyaline in 5% KOH; ornamentations amyloid, composed of conical to cylindrical warts up to 1.2 µm, isolated, never forming a reticulum; suprahilar spot unamyloid.

Basidia
33-41.5 × 10.5-13 µm, 4-spored, rarely 2-spored, some containing oil droplets; sterigmata up to 8 µm long.

Lamellar trama
Composed of nested sphaerocytes surrounded by connective hyphae.

Pleurocystidia
32-37.5 × 9.5-11.5 µm, clavate to subcylindrical, rarely fusiform, with obtuse to truncate apices, thin-walled, with abundant refractive granular contents, negative in SV.

Cheilocystidia
33-47.5 × 9-12.5 µm, clavate, with mucronate to rostrate apex, thin-walled, some with refractive granular contents, unchanging in SV. Marginal cells not differentiated.

Pileipellis
Orthochromatic in cresyl blue, divided into two layers: suprapellis trichoderm, composed of ascending to erect hyphae; subpellis a cutis, composed of septate, thin-walled, hyaline hyphae; terminal cells clavate to cylindrical, with obtuse apices; subterminal cells cylindrical or slightly inflated.

Pileocystidia
Abundant, unchanging in SV, mostly 13-33 × 3-6 µm, one-celled, cylindrical, apex obtuse, with granular contents, also present in subpellis.

Stipitipellis
A cutis, orthochromatic in cresyl blue, composed of repent, thin-walled, septate hyphae up to 4.6 µm broad.

Caulocystidia
Frequent, clavate to cylindrical, 16-35 × 3-8 µm, with obtuse or rostrate apex, one-celled, with refractive contents, unchanging in SV.

Stipe trama
Composed of connective hyphae and nested sphaerocytes.

Clamp connections
Absent.

Notes
Russula catillus was reported from Korea, and the name refers to the resemblance of the pileus to a small bowl traditionally used for holding soy sauce. *R. pseudocatillus* F. Yuan & Y. Song, sp. nov., is sharing similar overall color and shape with *R. catillus*. Dermatocystidia (both pileocystidia and caulocystidia) are present in our species, but were reported (in Lee *et al.* 2017) as absent in *R. catillus*, something that is highly unexpected and should be verified again as all of the presently known species in sect. *Ingratae* from any part of the world all have abundant dermatocystidia and abundant gloeoplerous elements in all of the tissues. *Russula pseudocatillus* F. Yuan & Y. Song, sp. nov. is very similar to this *R. catillus*, but it differs from the latter in its smaller basidiomata, irregular presence of lamellulae, much bigger basidiospores ornamented with higher warts that are never interconnected into a reticulum, and also because of its smaller pleurocystidia and poorly gelatinized pileipellis (see Tables 1, 2).

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TABLE 1.—Comparison of morphological characters of *R. viridicinnamomea* F. Yuan & Y. Song, sp. nov. with its closely related taxa. Characters in bold fonts are significantly different from those of *R. viridicinnamomea* F. Yuan & Y. Song, sp. nov.

Character	***R. viridicinnamomea* F. Yuan & Y. Song sp. nov.**	***R. bubaline* J. W. Li & L. H. Qiu**	***R. pseudobubalina* J. W. Li & L. H. Qiu**
Pileus color	green-tinged cinnamon	**cinnamon buff**	**cinnamon buff**
Pileus margin	undulate, peeling readily	acute, **not peeling readily**	acute, **not peeling readily**
Lamellae	adnate, forked near stipe	adnate, forked	**not forked**
Lamellulae	absent	**present**	**present**
Stipe (cm)	3-4.5 × 0.7-1	**2.2-2.5 × 0.6-0.8**	**2.3-3.1 × 0.9-1.1**
Basidiospore (µm)	(5.1) 5.3-6.1-7.0 (8.1) × (3.6) 4.2-4.7-5.5 (5.8)	**(4.4) 4.8-5.7-6.6 (8.6) × (3.7) 3.9-4.7-5.3 (6.2)**	**(5.4) 5.8-6.2-7.0 × 4.7-5.3-5.9**
Spore ornamentation	forming incomplete network	**rarely connected**	**rarely connected**
Pleurocystidia (µm)	31.5-66 × 4.5-13.5	**30.7-89.9 × 7.9-13.0**	**37.3-89.6 × 7.6-12.4**
Pleurocystidia in SV	dark grey	**brown**	**brown**

TABLE 2.— Comparison of morphological characters of *R. pseudocatillus* F. Yuan & Y. Song sp. nov. and *R. catillus* Lee, Park & Lim.

Character	***R. pseudocatillus* F. Yuan & Y. Song sp. nov.**	***R. catillus* Lee, Park & Lim**
Basidiomata	small sized	medium sized
Pileus color	reddish brown in the center and pale white at margin	golden brown to brown at center, or brownish grey
Pileus margin	slightly undulate, striate	prominently striate, incurved first
Lamellulae	present	absent
Stipe (cm)	2.5-4 × 0.6-1	4-10 × 1-2.5
Basidiospore (µm)	7.0-7.9-8.6 (9.2) × (5.1) 5.5-6.1-6.6 (6.7)	5.6-6.2-6.6 (7.4) × 4.6-5.3-5.6 (5.8)
Spore ornamentation	never forming a reticulum	mostly isolated, sometimes partly reticulate
Pleurocystidia (µm)	32-37.5 × 9.5-11.5	38.7-70.7 × 6.7-10.6
Suprapellis	trichoderm	ixotrichoderm

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