

Genus *Ramaria* in the eastern Himalaya: Subgenus *Laeticolora*—I

K S THIND and R M SHARDA

Department of Botany, Panjab University, Chandigarh 160 014, India

MS received 12 June 1985; revised 3 December 1985

Abstract. In this paper an account of 11 taxa of the genus *Ramaria* (Fr.) Bonorden collected from different localities in the eastern Himalaya and adjoining hills is given. Of the taxa included, *Ramaria conjunctipes*, *Ramaria araiospora* var. *rubella*, *Ramaria xanthosperma*, *Ramaria rubribrunnescens*, *Ramaria flavigelatinosa*, *Ramaria flavigelatinosa* var. *carnisalmonea* and *Ramaria gelatiniaurantia* are new records for the Himalayas; while *Ramaria rubrogelatinosa*, *Ramaria brevispora*, *Ramaria brevispora* var. *albida* and *Ramaria perbrunnea* were not known earlier from the eastern Himalaya.

Keywords. *Ramaria*; taxonomy; eastern Himalaya.

1. Introduction

Ramaria is the largest genus amongst clavarioid fungi but has scarcely been documented in most parts of the world (Corner 1950; 1970). In India, Thind (1961) and Khurana (1977) reported numerous species of this genus from various localities in the north-western Himalaya. The genus was, however, rather poorly recorded in the eastern Himalaya. During their extensive exploration in the eastern Himalaya, the authors have found the genus abundantly represented in the region.

According to the modern trend, all the taxa belonging to the genus *Ramaria* are treated under 4 subgenera viz. *Ramaria*, *Laeticolora*, *Echinoramaria* and *Lentoramaria*. Of these, subgenus *Laeticolora* Marr and Stuntz is the largest and is characterized by generally massive, fleshy basidiocarps, terrestrial habitat, hyphae with or without clamps and warted basidiospores. All the taxa, which are recorded for the first time from the Himalaya have been described in detail. Additionally, some species from the north-western Himalaya, which were described many years ago by Corner (1966) and Corner *et al* (1958) have not been recorded again from the Himalaya. We have found some of these species in the eastern Himalaya, which here amplifies previous descriptions and documents an extended range of occurrence. The material of all the taxa has been deposited at the Herbarium, Department of Botany, Panjab University (PAN) and at some noted foreign herbaria as indicated. The abbreviations used for herbaria follow Holmgren and Keuken (1974) and the colour standards are according to Kornerup and Wanscher (1967).

2. Subgenus: *Laeticolora* Marr and Stuntz, *Bibliotheca mycol.* 38: 50. 1973

2.1 *Ramaria conjunctipes* (Coker) Corner, *Ann. Bot. Mem.* 1: 567. 1950 (figures 1–6)

Fruit-bodies up to 15 × 5.5 cm, slender, fleshy-waxy, usually occurring in caespitose groups of 2–3, gregarious, light orange to salmon yellow coloured, unchanging on

bruising; trunk slender, long, partially buried in the substratum, up to 5×0.6 cm, white; branching 3–4 times, dichotomous, internodes of the lower branches up to 0.3 cm wide, smooth; axils narrowly U-shaped; tips acute to subacute, mostly bifid, light yellow; flesh concolorous; taste and smell not distinctive.

Hyphal system monomitic; hyphae up to $12 \mu\text{m}$ wide, without clamps, thin-walled, acyanophilous; ampullaeform swellings prominently ornamented; gloeoplerous hyphae uncommon, up to $3 \mu\text{m}$ wide, simple or sparsely branched, inflated near the septa, thin-walled, cyanophilous. Basidia up to $67 \times 8.5 \mu\text{m}$, clavate, guttulate, unclamped, 4-spored; sterigmata up to $7 \mu\text{m}$ long; thick-walled, persistent basidia up to $35 \times 12 \mu\text{m}$, wall up to $1.5 \mu\text{m}$ thick, granular, 4-spored. Basidiospores $7-8.5(-9.5) \times 4-5(-5.5) \mu\text{m}$, broad-ellipsoid, or oval, uni- to biguttulate; wall slightly thickened, minutely warted, cyanophilous; apiculus up to $0.8 \mu\text{m}$ long.

Specimen examined: R M Sharda 22239 (PAN; SUCO), on soil under mixed forest, Nawephu, Thimphu, Bhutan, September 18, 1980.

A single collection of this species from Bhutan indicates its rare occurrence in the eastern Himalaya. The species is marked by light orange to salmon coloured fruit-bodies with distinct, acute, light yellow tips; fasciculate habit; absence of clamps and short, broadly ellipsoid, or oval, finely warted basidiospores. It agrees well with the description as given by Corner (1950). The thick-walled, persistent basidia observed in the present collection have not been reported earlier for this species.

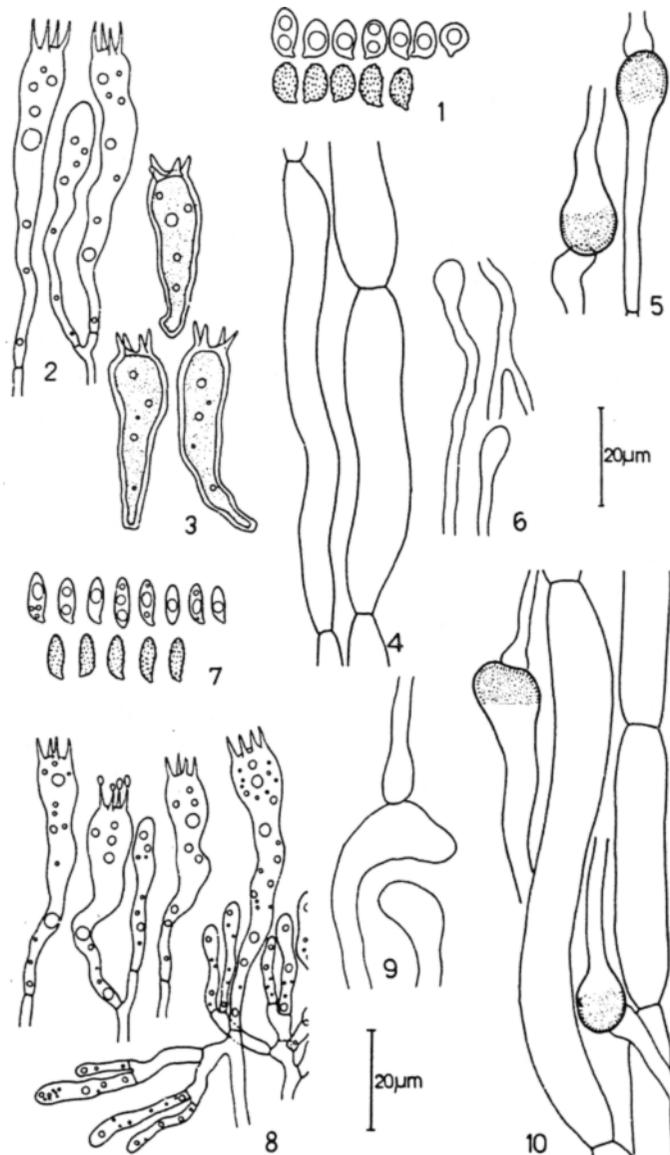
2.2 *Ramaria araiospora* Marr and Stuntz, var. *rubella* Marr and Stuntz, *Bibliotheca mycol.* 38: 57, 1973 (figures 7–10)

Fruit-bodies up to 10×4.5 cm, fleshy, solitary, gregarious, crimson red to deep scarlet red in colour, not fading at maturity, unchanging on bruising; distinct trunk absent, small, white, stubby base (up to 2 cm long) present; branches polychotomous below, dichotomous above, profuse, unequal, in alternating planes, internodes of the basal branches up to 5 mm wide, becoming thinner, shorter and compact upward, smooth; axils narrow; tips subacute, minute, in pairs or clustered, concolorous with the branches; flesh lighter concolorous; taste and smell not distinctive.

Hyphal system monomitic; hyphae up to $11.5 \mu\text{m}$ wide, without clamps, thin to slightly thick-walled, acyanophilous; ampullaeform swellings ornamented; gloeoplerous hyphae uncommon, up to $4.5 \mu\text{m}$ wide, simple, inflated near the septa, thin-walled, cyanophilous, Basidia up to $58 \times 8.5 \mu\text{m}$, clavate, guttulate, unclamped, 4-spored; sterigmata up to $5.5 \mu\text{m}$ long. Basidiospores $7-9.5 \times 2.8-3.5 (-4) \mu\text{m}$, subcylindric, uni- to 3-guttulate; thin-walled, subverruculose, cyanophilous; apiculus up to $0.8 \mu\text{m}$ long.

Specimens examined: R M Sharda 22444 (PAN), on soil under mixed forest, Shergaon, West Kameng, Arunachal Pradesh, September 6, 1981; R M Sharda 22476 (PAN), on soil under angiospermous forest, 15 km (Rupa-Shergaon road), West Kameng, Arunachal Pradesh, September 10, 1981; R M Sharda 22499 (PAN), on soil under deciduous woods, 3 km (Jamiri-Buragaon road), West Kameng, Arunachal Pradesh, September 13, 1981.

This is a very beautiful fungus and can be easily spotted in the field because of its bright red colour. All the eastern Himalayan collections from Arunachal Pradesh conform well to the description of this variety as given by Marr and Stuntz (1973). The



Figures 1–10. *R. conjunctipes*. 1. Basidiospores. 2. Normal basidia. 3. Thick-walled basidia. 4. Context-hyphae. 5. Ampullaeform swellings. 6. Gloeoplerous hyphae. *R. araiospora* var. *rubella*. 7. Basidiospores. 8. Basidia. 9. Gloeoplerous hyphae. 10. Context-hyphae and ampullaeform swellings.

basidiospores in the eastern Himalayan collections are, however, smaller in size than recorded by Marr and Stuntz (1973) (average up to $9.8 \times 3.6 \mu\text{m}$; range $8\text{--}14 \times 3\text{--}5 \mu\text{m}$).

We have examined a US collection No. 45881 (TENN; on needle duff under mixed conifers, Vicinity of Humptulip, Jefferson Co, Washington, October 6, 1984) sent by Professor R H Petersen. Our eastern Himalayan collections resemble it closely.

2.3 *Ramaria xanthosperma* (Peck) Corner, Ann. Bot. Mem. 1: 632. 1950 (figures 11–14)

Fruit-bodies up to 11.5 × 3.5 cm, medium sized, fleshy, occurring singly, gregarious, white to yellowish white or cream coloured; trunk indistinct to distinct, when distinct up to 3.5 × 1.5 cm, bulbous, yellowish white, with numerous tan red to dull red spots, rubescent on handling; branches profuse, polychotomous throughout, lax, internodes of the lower branches up to 0.6 cm wide, erect, becoming narrower (up to 0.3 cm) upward, smooth; axils broad; tips minute, subacute to obtuse, pale yellow; flesh white; taste and smell not distinctive.

Hyphal system monomitic; hyphae up to 15 µm wide, without clamps, sparsely branched, thick-walled (wall up to 1 µm thick), acyanophilous; ampullaeform swellings ornamented; gloeoplerous hyphae up to 3 µm wide, rarely inflated near the septa, thin-walled, cyanophilous. Basidia up to 86 × 12 µm, long-clavate, guttulate, unclamped, 4-spored; sterigmata up to 8.5 µm long. Basidiospores average 17.5 × 4 µm; range 14.5–19.5 × 3.5–4.5 µm, subcylindric to cylindric-ellipsoid, uni- to multiguttulate, subsigmoid; wall thin to slightly thickened, warts minute, arranged in rows, cyanophilous; apiculus up to 1.2 µm long.

Specimen examined: R M Sharda 22351 (PAN; TENN), on soil under mixed forest, D'Dzong, Paro, Bhutan, August 9, 1981.

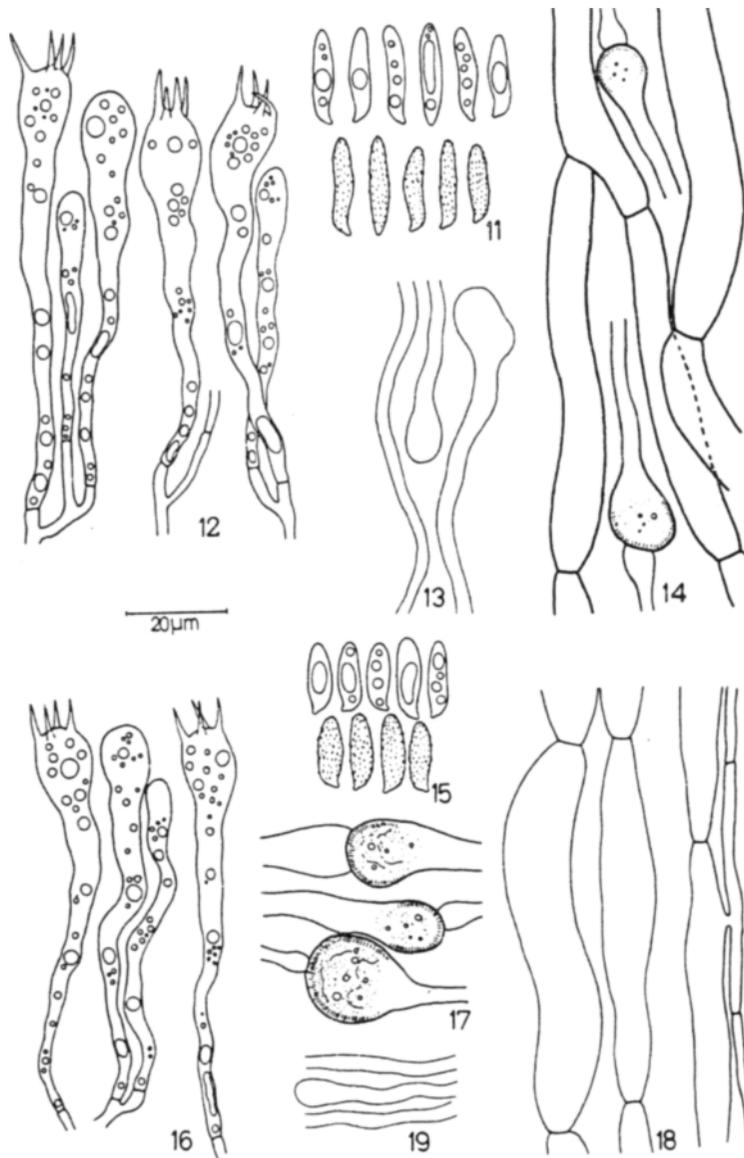
Diagnostic features of this species are the yellowish white to cream colour of the fruit-bodies with conspicuous dull red to tan red spots on the basal part; thick-walled, clampless hyphae; and subsigmoid, minutely warted, long basidiospores. But for the slightly larger basidiospores the Bhutan collection closely resembles the description given by Corner (1950, 1970).

2.4 *Ramaria rubribrunnescens* Marr and Stuntz, Bibliothca mycol. 38: 111. 1973 (figures 15–19)

Fruit-bodies up to 21.5 × 9 cm, fleshy, solitary, scattered closely, pale yellow to cream coloured; trunk up to 3 × 0.6 cm, in other fruit-bodies trunk consists of 3–4 subfasciculate branches, white, trunk or lower part of branches with numerous scattered red spots or sometimes the basal branches staining reddish brown, perhaps vinescent on handling; branching profuse, polychotomous below, dichotomous above, internodes of the lower branches up to 0.5 cm wide, smooth, becoming thinner, shorter and compact upward; axils U-shaped or narrow; tips minute, obtuse, swollen, light yellow; flesh white to paler concolorous; taste and smell not distinctive.

Hyphal system monomitic; hyphae up to 14.5 µm wide, without clamps, sparsely branched, wall slightly thickened, acyanophilous; ampullaeform swellings conspicuously ornamented; gloeoplerous hyphae rare, up to 3 µm wide, simple, thin-walled, cyanophilous. Basidia up to 82 × 12.5 µm, clavate, guttulate, unclamped, 4-spored; sterigmata up to 7 µm long. Basidiospores 12.5–14(–15.5) × 4–5(–5.5) µm, subcylindric to ellipsoid, uni- to multiguttulate; thin-walled, subverruculose to verrucose, cyanophilous; apiculus up to 1 µm long.

Specimens examined: R M Sharda 22240 (PAN), on soil under mixed forest, Nawephu, Thimphu, Bhutan, September 18, 1980; R M Sharda 22266 (PAN), on soil under mixed forest of *Picea*, *Abies* and *Rhododendron*, Chankaphug, Thimphu, Bhutan, September 23, 1980.

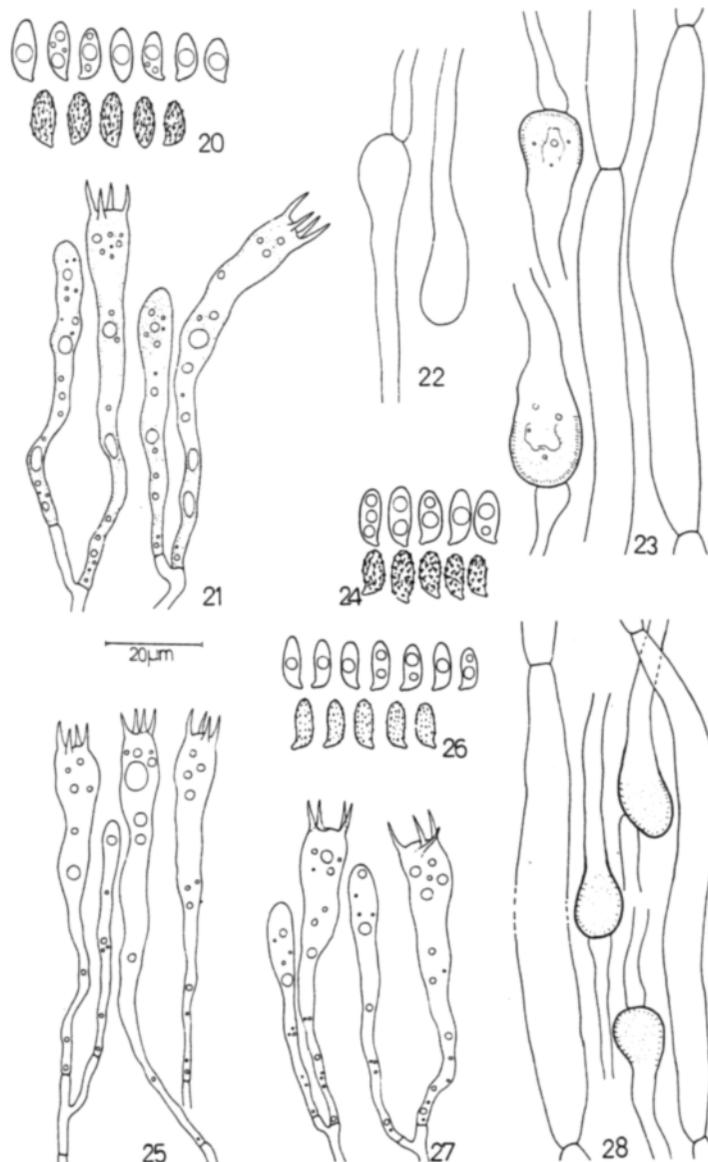


Figures 11–19. *R. xanthosperma*. 11. Basidiospores. 12. Basidia. 13. Gloeoplerous hyphae. 14. Thick-walled context-hyphae and ampullaeform swellings. *R. rubribrunnescens*. 15. Basidiospores. 16. Basidia. 17. Ampullaeform swellings. 18. Context-hyphae. 19. Gloeoplerous hyphae.

Characteristics that separate *R. rubribrunnescens* from the similar species are massive basidiocarps, pale yellow to cream in colour; numerous dull red or tan red spots (perhaps vinescent) on the trunk and basal branches; hyphae without clamps; and subcylindric to ellipsoid, minutely warted basidiospores. Both the eastern Himalayan collections resemble closely the description given by Marr and Stuntz (1973).

2.5 *Ramaria flavigelatinosa* Marr and Stuntz, *Bibliothca mycol.* 38: 81. 1973 (figures 20–23)

Fruit-bodies up to 10 × 6 cm, medium sized, solitary, gregarious, yellowish white to light yellow, unchanging on bruising; distinct trunk absent, instead the base consisting of several branches, white, occasionally with dull violet spots observed on these



Figures 20–28. *R. flavigelatinosa*. 20. Basidiospores. 21. Basidia. 22. Gloeoplerous hyphae. 23. Context-hyphae and ampullaeform swellings. *R. flavigelatinosa* var. *carnismonea*. 24. Basidiospores. 25. Basidia. *R. gelatiniaurantia*. 26. Basidiospores. 27. Basidia. 28. Context-hyphae and ampullaeform swellings.

branches; branching polychotomous, lax, internodes of the basal branches up to 0.5 cm wide, smooth, becoming thinner and shorter in the subsequent branches; axils wide open; tips single or dichotomous, subacute to obtuse, sunflower yellow; flesh paler concolorous, watery; texture gelatinous when fresh, becoming tough after drying; taste and smell not distinctive.

Hyphal system monomitic; hyphae up to 13.5 μm wide, without clamps, wall thin to slightly thickened, acyanophilous; ampullaeform swellings ornamented; gloeoplerous hyphae common, up to 4 μm wide, inflated near the septa, thin-walled, cyanophilous. Basidia up to 70 \times 10 μm , clavate, granular-guttulate, unclamped, 4-spored; sterigmata up to 7.5 μm long. Basidiospores average 10.5 \times 4.5 μm ; range 8.5–11(–12) \times 4–5(–5.5) μm , broad-ellipsoid, uni- to multiguttulate; wall slightly thickened, verruculose, warts in oblique rows, cyanophilous; apiculus up to 1 μm long.

Specimens examined: R M Sharda 22103 (PAN), on soil under *Pinus kesiya* forests, Elephant falls, Shillong, Meghalaya, September 18, 1979; R M Sharda 22132 (PAN), on soil under *P. kesiya* forest, Shillong Peak, Shillong, Meghalaya, September 21, 1979; R M Sharda 22142 (PAN), on soil under *P. kesiya* forest, Sweet falls, Shillong, Meghalaya, September 23, 1979; R M Sharda 22217 (PAN), on soil under angiospermous forest, Batasi, Darjeeling, West Bengal, August 28, 1980; R M Sharda 22310 (PAN), on soil under broad-leaved forest, Bunakha, Chimakothi, Bhutan, July 29, 1981.

The species is fairly common in the eastern Himalaya. All these collections closely resemble the description of this species as given by Marr and Stuntz (1973) but for the larger fruit-body size in the collections made from Washington (up to 5–14 \times 3–24 cm; fide Marr and Stuntz 1973).

2.6 *Ramaria flavigelatinosa* Marr and Stuntz, var. *carnisalmonea* Marr and Stuntz, *Bibliotheca mycol.* 38: 83. 1973 (figures 24–25)

Variety *carnisalmonea* resembles *R. flavigelatinosa* var. *flavigelatinosa* in all other macroscopic and microscopic features but for the sole characteristic of salmon colour of the context.

The only eastern Himalayan collection made from Bhutan agrees closely with the concept of this variety as given by Marr and Stuntz (1973). It is marked by light yellow colour of the fruit-bodies with orange or pinkish tinge in the upper parts; yellow tips; salmon colour of the context; gelatinous consistency of the fresh specimens; lack of clamps and subcylindric to ellipsoid, distinctly warted basidiospores, 9.5–11.5 \times 4–5 μm .

Specimen examined: R M Sharda 22238 (PAN; SUCO), on soil under mixed forest, Nawephu, Thimphu, Bhutan, September 19, 1980.

2.7 *Ramaria gelatiniaurantia* Marr and Stuntz, *Bibliotheca mycol.* 38: 93. 1973 (figures 26–28)

Fruit-bodies up to 9 \times 8 cm, fleshy, gregarious or scattered, orange white to deep orange, colour unchanging on bruising; distinct trunk absent, instead base consisting of 4–5 connate, primary branches, white to orange white; branching profuse, polychotomous, internodes of the basal branches up to 0.8 cm wide, smooth, becoming

thinner, shorter and compact in the upper branches; axils narrow; tips minute, mostly acute to rarely subacute, deep orange; flesh lighter concolorous, watery; texture gelatinous, especially the basal part more gelatinized than the rest of the fruit-body, drying tough and brittle; taste and smell not distinctive.

Hyphal system monomitic; hyphae up to $12.5(-17) \mu\text{m}$ wide, without clamps, sparsely branched, wall slightly thickened, acyanophilous; ampullaeform swellings prominently ornamented; gloeoplerous hyphae not observed. Basidia up to $65 \times 11 \mu\text{m}$, clavate, guttulate, weakly cyanophilous, unclamped, 4-spored; sterigmata up to $7 \mu\text{m}$ long. Basidiospores average $9.5 \times 4 \mu\text{m}$; range $8.5-10(-11) \times 3.8-4.5 \mu\text{m}$, subcylindric, uni- to biguttulate; wall thin to slightly thickened, verruculose, cyanophilous; apiculus up to $1 \mu\text{m}$ long.

Specimen examined: R M Sharda 22121 (PAN; SUCO), on soil under *P. kesiya* forest, Risa colony, Shillong, Meghalaya, September 20, 1979.

This collection from Shillong conforms well to the description of this species as given by Marr and Stuntz (1973). However, the fruit-bodies measure up to $6-22 \times 4-11 \text{ cm}$ and possess gloeoplerous hyphae in the context in the Washington collection, whereas our collection measures up to $9 \times 8 \text{ cm}$ and lacks gloeoplerous hyphae in the context.

Professor R H Petersen sent us two collections, No. 45845 (TENN; on needle duff under hemlock forests, Mt. Hood Nat'l forest, Green Cyn Campgrd Road, Oregon, USA, October 20, 1984) and No. 45851 (TENN; on needle duff under mixed conifer forest, vicinity of Humptulip, Jefferson Co., Washington, USA, October 6, 1984) which were examined by us. The Shillong collection closely resembles these US collections.

2.8 *Ramaria rubrogelatinosa* Corner and Thind, Trans. Br. mycol. Soc. 49: 110. 1966

Fruit-bodies up to $18 \times 9 \text{ cm}$, fleshy, gregarious to scattered, pink to light red in colour, fading to cream or white in mature specimens with age, unchanging on bruising; distinct trunk absent, instead small, stubby base present, buried in soil, white; branching starting immediately at the ground level, profuse, polychotomous below, dichotomous above, internodes of the basal branches thick, up to 1 cm wide, becoming thinner and compact upward; axils acute; tips minute, subacute to obtuse, deep red, colour not fading with age; flesh white to paler concolorous; texture gelatinous, drying hard, brittle; taste and smell not distinctive.

Hyphal system monomitic; hyphae up to $12(-15) \mu\text{m}$ wide, without clamps, wall thin, acyanophilous; ampullaeform swellings conspicuously ornamented; gloeoplerous hyphae uncommon, up to $4 \mu\text{m}$ wide, simple to forked, inflated near the septa, thin-walled, cyanophilous. Basidia up to $70 \times 8.5 \mu\text{m}$, clavate, unclamped, weakly cyanophilous, 4-spored; sterigmata up to $6.5 \mu\text{m}$ long. Basidiospores $7.5-9.5(-10.5) \times 4-4.5(-5) \mu\text{m}$, ovoid to broad-ellipsoid, uni- to multiguttulate; wall slightly thickened, rugulose to subverruculose, cyanophilous; apiculus up to $0.7 \mu\text{m}$ long.

Specimens examined: R M Sharda 22071 (PAN), on soil under angiospermous forest, Takdah Cantt., Darjeeling, West Bengal, August 31, 1979; R M Sharda 22137 (PAN), on soil under angiospermous forests, Shillong Peak, Shillong, Meghalaya, September 21, 1979; R M Sharda 22179 (PAN), on soil under angiospermous forest, Takdah Cantt., Darjeeling, West Bengal, August 17, 1980; R M Sharda 22448 (PAN), on soil

under mixed forest, Shergaon, West Kameng, Arunachal Pradesh, September 6, 1981; R M Sharda 22497 (PAN), on soil under predominantly broad-leaved forest, 3 km (Jamiri-Buragaon road), West Kameng, Arunachal Pradesh, September 13, 1981.

In the eastern Himalaya, the species is well represented and grows chiefly under the broad-leaved forests. All the collections made by us closely resemble the north-western Himalayan collections as described by Corner (1966) and Khurana (1977). Main features of this species are the pink to light red colour of the fruit-bodies, fading to cream or white with age; tips deep red and not fading at maturity; gelatinous consistency; total lack of clamps and rugulose to subverruculose basidiospores.

2.9 *Ramaria brevispora* Corner, Thind and Dev, Trans. Br. mycol. Soc. 41: 203. 1958

Fruit-bodies up to 15 × 6 cm, fleshy, gregarious to scattered, light yellow, colour unchanging on bruising; trunk usually indistinct, when distinct up to 2.5 × 0.6 cm, smooth, yellowish white; branching profuse, polychotomous below, dichotomous above, internodes of the basal branches up to 0.4 cm wide, becoming thinner, shorter and compact in the upper branches, smooth; axils wide open; tips minute, dichotomous or multiple, blunt, deep yellow; flesh white; taste and smell not distinctive.

Hyphal system monomitic; hyphae up to 10.5(–14) μm wide, without clamps, sparsely branched, thin-walled, acyanophilous; ampullaeform swellings ornamented; gloeoplerous hyphae not observed. Basidia up to 56 × 8.5 μm, clavate, guttulate, weakly cyanophilous, unclamped, 4-spored; sterigmata up to 6 μm long. Basidiospores 5.5–7 × 4–5 μm, subglobose to sublacrimiform, uniguttulate; wall slightly thickened, finely warted, warts more conspicuous toward the distal end of the basidiospores, cyanophilous; apiculus up to 0.7 μm long.

Specimens examined: R M Sharda 22115 (PAN), on soil under angiospermous forest, Mawphlang, Shillong, Meghalaya, September 19, 1979; R M Sharda 22457 (PAN), on soil under mixed forest, Shergaon-Kalaktang road, West Kameng, Arunachal Pradesh, September 7, 1981; R M Sharda 22491 (PAN), on soil under broad-leaved forest, 3 km (Jamiri-Buragaon road), West Kameng, Arunachal Pradesh, September 13, 1981.

During our exploration in the eastern Himalaya, we collected this fungus thrice under predominantly angiospermous forests. These collections resemble closely the holotype (at PAN). Distinguishing features of this species are the light yellow coloured fruit-bodies having deep yellow, blunt tips; total lack of clamps; and subglobose to sublacrimiform, finely warted, 5.5–7 × 4–5 μm basidiospores. This is the second report of the occurrence of this species from the Himalaya after it was reported in 1958.

2.10 *Ramaria brevispora* Corner, Thind and Dev, var. *albida* Corner, Thind and Dev, Trans. Br. mycol. Soc. 41: 204. 1958

This variety was described by Corner *et al* (1958) from Mussoorie (UP) and like *R. brevispora* it was also known only from the type locality previously. It resembles *R. brevispora* in all other details but for the different colour of the fruit-bodies which is marble white in the lower branches and tan white in the upper branches.

A single collection of this variety from Shergaon in Arunachal Pradesh differs from

the holotype (at PAN) in possessing gloeoplerous hyphae in the context. In all other details it closely resembles the description as given by its authors and Khurana (1977).

Specimen examined: R M Sharda 22458 (PAN), on soil under mixed forest, Shergaon, West Kameng, Arunachal Pradesh, September 7, 1981.

2.11 *Ramaria perbrunnea* Corner and Thind, *Trans. Br. mycol. Soc.* **49**: 109. 1966

Fruit-bodies up to 12 × 5 cm, fleshy, gregarious or scattered, light brown to dark brown, colour unchanging on bruising; distinct trunk absent, instead small, sub-fasciculate base present, up to 2 × 0.8 cm, bulbous, white; branching profuse, polychotomous below, dichotomous above, internodes of the basal branches stout, up to 0.5 cm wide, rugulose, internodes shorter and thinner in the subsequent branches; axils narrow to U-shaped; tips subacute to obtuse, concolorous; flesh white; texture brittle friable after drying; taste slightly bitter, smell not distinctive.

Hyphal system monomitic; hyphae up to 10.5 μm wide, without clamps, thin to slightly thick-walled, acyanophilous; ampullaeform swellings conspicuously ornamented; gloeoplerous hyphae not observed. Basidia up to 81 × 9 μm, clavate, guttulate, unclamped, 4-spored; sterigmata up to 7 μm long. Basidiospores average 11.2 × 5.5 μm; range 10.5–12(–13.5) × 4.5–6 μm, broadly ovoid, uni- to multiguttulate; wall slightly thickened, surface prominently warted, warts coarse, irregular, dense, cyanophilous; apiculus up to 1.2 μm long.

Specimen examined: R M Sharda 22246 (PAN), on soil under mixed forest, Begana, Thimphu, Bhutan, September 19, 1980.

The Bhutan collection resembles well the holotype (at PAN) examined by us. The species is marked by medium sized fruit-bodies arising from subfasciculate base; stout branches; brown colour; slightly bitter taste and uni- to multiguttulate, coarsely warted basidiospores.

Acknowledgements

The authors are thankful to the Department of Science and Technology, New Delhi for providing financial assistance to carry out the study of these fungi. They are also grateful to Professor Ronald H Petersen, Department of Botany, University of Tennessee, Knoxville, USA and Dr Currie D Marr, Department of Biology, State University College, Oneonta, New York, USA for their expert comments on authenticity of some of the taxa.

References

- Corner E J H 1950 A monograph of *Clavaria* and allied genera; *Ann. Bot. Mem.* **1** 740
 Corner E J H 1966 Species of *Ramaria* (Clavariaceae) without clamps; *Trans. Br. Mycol. Soc.* **49** 101–113
 Corner E J H 1970 Supplement to "A monograph of *Clavaria* and allied genera"; *Beih. Nova Hedwigia* **33** 299
 Corner E J H, Thind K S and Dev S 1958 The Clavariaceae of the Mussoorie Hills (India) IX. *Trans. Br. Mycol. Soc.* **41** 203–206
 Holmgren P K and Keuken W 1974 Index Herbariorum, Part I. The herbaria of the world; *Regnum Veg.* **92** 397

- Khurana I P S 1977 *Studies on the clavarioid fungi of India*, Ph.D. thesis. Panjab University, Chandigarh
- Kornerup A and Wanscher J H 1967 *Methuen handbook of colour*, 2nd edition (London: Methuen & Co. Ltd.) p 243
- Marr C D and Stuntz D E 1973 *Ramaria* of Western Washington; *Bibliothca Mycol.* **38** 232
- Thind K S 1961 *The Clavariaceae of India*, (New Delhi: Indian Council Agri. Res.) p 197