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Cortinarius Notebook 1

L. R. Hesler

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Cortinarius

Key to North American
Species of Cortinarius

by

Alexander H. Smith

1951 - Revision

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1951 Revision

- Subgenus: *Myxadium* p. 1
Subgenus: *Bulbopodium* p. 9
Subgenus: *Phlegmacium* p. 28
Subgenus: *Inoloma* p. 38
Subgenus: *Hygrophanus* p. 61

Key to North American
Species of Cortinariarius
by Alexander Smith

A. Pileus viscid

1. Stipe not viscid

a. Bulb of stipe marginate in young

carpophores.....2. Bulbopodium p. 9

a. Stipe equal to clavate

at first.....3. Phlegmacium p. 28

1. Stipe viscid.....1. Myxadium p. 1

A. Pileus moist to dry but not with a
gelatinous pellicle

1. Pileus typically dry or at least

not hygrophanous.....4. Inoloma-Dermocybe p. 38

1. Pileus moist at first and at least

subhygrophanous.....5. Hygrophanus ^{us} p. 61

Subgenus Myxacium

Both pileus and stipe viscid, when gluten has dried
pileus and stipe shiny or with a varnished appearance.
The presence of gelatinous layers on dry specimens can
be checked by mounting sections in KOH.

A. Stipe essentially equal in button

stages.....Section Splendidi p. 1

A. Stipe typically clavate in button

or young stages.....Section Clavati p. 5

Section Splendidi

1. Stipe 3-6.5 cm. thick; pileus 11-35 cm.
broad; spores 8.5-11 μ long; lamellae
staining russet.....1. C. ponderosus
1. Not as above.....2
2. Clamp connections not present on hyphae
of cap pellicle (occasional pseudo-clamp
may be seen).....3
2. Clamp connections almost regularly present
at cross walls on hyphae of cap pellicle.....3
3. Lamellae pallid to yellowish young ("pinkish
buff" or brownish), gluten on stipe hyaline.....4
3. Lamellae bluish to lavender young; gluten
on stipe also violaceous to lilac at first
but color often pale.....5
4. Spores 12-14 x 7-8 μ2-3. C. Sm. 27669
4. Spores 13-16 (17) x 7-8 μ4. C. Sm. 24105

5. Lamellae pale blue, glutinous sheath pale blue; pileus olive yellow to smoky olivaceous yellow; spores 10-13 x 7-8 μ ; pileus often rugulose.....5. C. elatior
5. Not as above.....6
6. Lamellae pale vinaceous lilac to pale vinaceous fawn.....7
6. Lamellae brownish; gluten of stipe with only a faint lilac tint.....C. Sm. 24105 (4)
7. Stipe typically with veil tissue separating into indistinct to distinct concentric zones; pileus pale grayish vinaceous near margin.....6. C. Sm. 17612
7. Stipe not as above; margin of pileus pallid.....7. C. Sm. 16841
8. Lower portion of stipe with concentric zones formed by the separation of the inner fibrillose veil plus the gelatinous veil.....9
8. Stipe typically smooth and with the inner veil intact at maturity.....13
9. Pileus deep brownish red ("Kaiser brown" to "hazel"); lamellae pale cinnamon brown young; spores 13-16 x 6.5-8 μ8. C. Sm. 25017
9. Not as above.....10
10. Spores 10-13 μ long.....11
10. Spores 12-15 μ long.....12

10. Spores 14-17 μ long; young cap pale smoke gray, gills pallid; gluten on stipe tinged smoky lilac gray at first; fruiting in the spring.....9. C. Sm. 21465
11. Gills pallid to yellowish; stipe brunescent below.....11. C. collinitus var. trivialis
11. Both gills and stipe tinged lilac to violaceous.....11a. C. collinitus var. repandus
12. The stipe as well as the gills lilac to violaceous.....10. C. collinitus var. collinitus
12. Gills pallid; stipe violaceous.....C. collinitus var. caeruliipes
13. No blue, violet or lilac tints present in young gills, stipe or universal veil of young carpophores.....14
13. Blue, violet or lilac tints present.....16
14. Spores 10-12.5 (13) \times 5-6.5 μ ^{nearly smooth (slightly rough)}.....12. C. submarginalis
14. Spores larger.....15
15. Spores 11-15 \times 5-6.5 μ ; pileus chestnut brown.....13. C. mucosus
15. Spores 14-17 (18.5) \times 7-8.5 μ ; pileus tawny-orange over all and translucent striate.....14. C. muscigineus
16. Pileus tawny, orange, rusty red or liver color; glutinous veil violaceous to purple drab; spores 13-18.5 \times 7-9 μ
.....(see Singer F-1757 also) 15. C. splendidus

collinitus = muciflavus

16. Pileus violaceous to lavender at least
on the margin when young and in age
army brown to dingy ochraceous.....17
17. Cheilocystidia absent or rare and gill
edge fertile.....19. C. cylindripes
17. Cheilocystidia forming a sterile band
on gill edge.....18. C. pseudosolor

Section Clavati

1. No violaceous, lilac or blue color anywhere on young carpophores (but see C. castaneicolor also).....2
1. Violaceous, lilac or blue color present at first.....9
2. Pellicle bitter to the taste (see Sm-19944 also).....20. C. vibratilis and forms
2. Not as above.....3
3. Odor fragrant; young gills citron yellow.....21. C. citrinifolius
3. Not as above.....4
4. Spores 8-12 μ long.....5
4. Spores 6-7.5 (8) μ long.....7
5. Spores 9-12 μ long; young gills pallid.....22. C. pallidifolius
5. Not as above.....6
6. Spores 8-10 x 5-6 μ ; young gills pallid to vinaceous fawn; pileus shaded grayish along margin.....23. C. Sm. 27981
6. Spores 7-9 x 4.5-5 μ ; pileus yellow ocher with an ochraceous tawny to cinnamon brown disc.....24. C. Hesler 16566
7. Odor faintly fragrant (as in Armillaria ponderosa).....25. C. Sm. 19944
7. Odor none.....8

8. Pileus clay color to darker brown.....26. C. 27313
8. Pileus whitish to cinnamon buff.....C. 26906 (246)
9. Spores 10-12.5 x 5-6 μ ; taste mild.....27. C. heliotropicus
9. Spores 10-12 μ long; taste raphanoid.....28. C. Burke CR.
9. Spores smaller.....10
10. Taste of pellicle bitter.....29. C. iodoides
10. Taste mild.....11
11. Pileus lacking violaceous, lilac or olive-gray color.....12
11. Pileus with violaceous, lilac or olive-gray in at least the button stages.....17
12. Spores 7-8 x 6-7.5 μ , subglobose; gills caesious at first.....30, 31. C. delibutus
12. Spores ellipsoid to slightly inequilateral.....13
13. Spores 6-7.5 x 3.5 μC. 26984
13. Spores larger.....14
14. Base of stipe lilac to pinkish lilac; pileus pinkish cinnamon to warm buff.....32. C. Hesler 16546
14. Not as above.....15
15. Pileus hazel to chestnut color on disc.....33. C. castanicolor
15. Pileus paler.....16

#16564

~~16546~~

16. Pileus yellow at first.....34. C. luteobrunnescens
16. Pileus whitish at first, becoming tinged cinnamon buff.....C. 26906 (246)
17. Spores globose to subglobose, varying to broadly ellipsoid 6-8(9) x 5.5-7(8) μ18
17. Spores typically ellipsoid (or not as above).....23
18. Lamellae yellow to brownish young.....19
18. Lamellae cinereous, lilac, or violaceous when young.....20
19. Pileus dull lilac at first but changing to olive yellow in age because of the changing gluten.....35. C. emunctus
19. Gluten not changing color in age.....36. C. Sm. 24717
20. Densely cespitose; stipe pale bright lilac over apex and in cortex, whitish downward; pileus vinaceous drab fading to cinnamon buff or clay color.....37. C. Sm. 20086
20. Not as above.....21
21. Cheilocystidia abundant; gill edge sterile or nearly so.....38. C. sterilis
21. Cheilocystidia not abundant and gill edge mostly fertile.....22
22. Pileus pale aniline lilac young; lamellae pale violaceous; stipe white with aniline lilac gluten.....39. C. salor (Sm. 27893)

22. Colors violaceous drab to olive
gray; gluten of stipe slowly staining
yellow to
argillaceous.....40. & 41. C. Sm. 19754 & 24618
23. Pileus and stipe merely viscid
to subviscid.....42. C. griseo-violaceus
23. Gluten copious on cap and stipe
of young carpophores.....24
24. Pileus 5-8(10) cm. broad, grayish
violaceous at first but becoming
olive ocher; lamellae at first pale
vinaceous drab; stipe 10-20 mm. at
apex.....43. C. griseoluridus
24. Not as above.....25
25. Spores 8-10 x 5-6 μ ; lamellae
dusky violaceous at
first.....44. & 45. C. lodes
25. Spores 7-9 x 4.5-5.2 μ ; lamellae
vivid lilac at first.....46. C. oregonensis

Subgenus Bulbopodium

Pileus viscid to glutinous, stipe dry to moist,
with a distinctly marginate bulb in at least the
button stages.

Key to Sections

- A. Lamellae at first lilac, violaceous,
bluish or cinereous ~~at first~~ (edges
yellow in a few species).....Section Violacei p. 17
- A. Lamellae yellow to green at
first.....Section Luteifolii p. 14
- A. Lamellae not as in either of
above choices.....Section Multiformes p. 10

Section Multiformes

Lamellae white, to pallid, gray or pale to dull
brown at first

1. Pileus whitish and not darkening or
changing color appreciably (some
eventually \pm cinnamon buff).....2
1. Pileus colored, or if white at first
changing markedly by maturity.....4
2. Bulb broad and depressed; cortina copious
(see C. 20769 also).....47. C. albidus
2. Bulb oblique and in age obsolete;
cortina thin.....3
3. Taste of pellicle slightly bitter;
growing under aspen on sandy soil...48. C. Sm. 20786
3. Taste mild; growing under conifers in
montane and subalpine forests.....49. C. Sm. 27126
4. Pileus lilac at first.....5
4. Pileus not lilac at first.....6
5. Spores 12-15 \times 7-8 μ50. C. 20901
5. Spores 9-12 \times 5-6.5 μ51. C. 20901a
6. Spores 9-12 μ or more long.....7
6. Spores 5-10 μ long.....18
7. Stipe lilac in cortex (often very pale).....8
7. Not as above.....9
8. Pileus vinaceous brown; universal veil
bright lilac.....52. C. 27471

8. Pileus ochraceous to alutaceous; no
universal veil evident.....53. C. aleuriosmus
8. Pileus alutaceous to fuliginous;
spores 14-18 x 8.5-10.5 μ54. C. reticulisporus
9. Spores (10) 11-14 μ long.....10
9. Spores 9-12 μ long.....13
10. Pileus pallid to alutaceous or tawny.....11
10. Pileus yellow to olive yellow.....12
11. Pileus whitish but soon tawny; lamellae
light vinaceous fawn young (obscurely
pinkish lilaceous).....55. C. 35695
11. Pileus pinkish buff to alutaceous;
lamellae white at first.....56. C. 35845
12. Pileus straw yellow with
an olivaceous tone; gills
pallid at first.....57. C. olivaceostramineus
12. Pileus yellow ocher; gills dull
brown young.....58. C. Wehmeyeri
13. Bulb merely a flange; pileus reddish
brown; context thick, compact, white
and unchanging.....C. balteatus (184)
13. Not as above.....14
14. Pileus light red.....59. C. sublateriteus
14. Pileus not as above.....15
15. Pleurocystidia and cheilocystidia abundant,
40-70 x 7-8(9) μ60. C. 35855
15. Pleurocystidia absent.....16

16. Pileus ochraceous tawny to pinkish
cinnamon and in age vinaceous cinnamon
(see 20642 also).....61. C. Sm. 20929
16. Pileus yellow at first.....17
17. Pileus becoming olive yellow to olive;
KOH on cuticle yellow.....62. C. Sm. 27550
17. Pileus mustard yellow becoming rusty
brown; KOH on cuticle dingy brown.....63. C. 35902
18. Pileus pinkish buff, olive buff, yellow,
orange yellow or pale ferruginous.....19
18. Pileus chestnut brown to cinnamon.....23
19. Spores 6.5-8 x 4.5-5 μ
.....65. C. multiformis var. microsporus
19. Spores 8-10 μ long.....20
20. Pileus yellow to pale ferruginous-
orange.....64. C. multiformis var. multiformis
20. Not as above.....21
21. Pileus pale olive buff, becoming
cinnamon buff on disc and deep olive
buff along margin.....66. C. Sm. 28265
21. Pileus pale pinkish buff to light
pinkish cinnamon.....22
22. Spores 9-10 x 5.5-7; bulb broad and
saucerlike, depressed.....61. C. 20929
22. Spores 7-9 x 5-5.5 μ ; bulb broad
but oblique.....67. C. latus

23. Pileus soon nearly cinnamon
brown, merely viscid; growing
under hardwoods.....68. C. squalidus
23. Pileus chestnut color, glutinous;
growing under conifers in the
mountains.....69. C. Sm. 31743 & Sm. 19375 (70)

Section Luteifolii

Young gills yellow, olive or green

1. Spores 3-10 μ long or smaller.....2
1. Spores 9-12 μ long or larger.....7
2. Stipe with lilac or violaceous tints.....3
2. Not as above.....5
3. Cortina copious and white; pileus
violaceous at first.....71. C. vellicopia
3. Not as above.....4
4. Cortina yellowish and not copious;
pileus olive brown at first.....72. C. scaurus
4. Lilac developing in apex after stipe is
cut.....33. C. orichalceus var. xanthocephalus
5. Pellicle reddish to purple in KOH, or
gill trama with vinaceous red pigment or
some basidia with purple to vinaceous
granules; gills sulphur yellow to olive ocher.....6
5. Not as above; spores
7-9 x 6.5-8 μ73. C. citrinellus
6. Spores 6-7 μ broad; pileus "xanthine
orange".....33. C. orichalceus var. xanthocephalus
6. Spores 4-5.5 μ ; pileus sulphur
yellow.....74. & 75. C. fulmineus var. sulphureus
7. No red, vinaceous, rusty rose color, or
purple in pellicle, hypoderm, gill trama or
basidia when these are treated with KOH.....8

7. When treated with KOH with at least one of the colors mentioned present in one of the structures.....15
8. Lamellae olivaceous yellow to green.....9
8. Lamellae chamois, canary yellow to honey yellow.....12
9. Pileus dark brown streaked with olive.....76. C. Montanus
9. Pileus yellow or olive color at first.....10
10. Stipe bluish to lilac at least in apex.....77. C. virentophyllus
10. Stipe lacking bluish to lilac colors.....11
11. Pileus olive colored; cuticle yellow in KOH when fresh.....78. C. prasinus
11. Pileus yellow when young, cuticle slowly deep reddish brown in KOH when fresh.....79. C. 36086
12. Spores 12-15 x 7.5-9.5 μ ; odor of fresh green corn.....80. C. 35713
12. Not as above, (spore 6-8 μ broad).....13
13. Pileus picric yellow becoming orange rust color to reddish.....81. C. 35904
13. Pileus dark brown.....14
14. Spores broadly ellipsoid.....82. C. 24990
14. Spores inequilateral in side view.....83. C. 31359
15. Spores 13-18.2 x 7-9 μ ; taste of flesh tardily bitter..... 90. C. elegantoides

15. Spores smaller.....16
16. Flesh of cap with lavender
tints.....92. C. cedretorum
16. Flesh not as above.....17
17. Pileus becoming vinaceous brown in age.....18
17. Pileus not as above (becoming rusty
to ferruginous in some).....19
18. Odor distinctive.....
.....85. C. orichalceus var. orichalceus
18. Odor not distinctive.....
.....86 - 87. C. orichalceus var. olympianus
19. Pileus drab with orange tints, the marginal
turning "dull Indian purple" in herbarium.
area grayish olive.....84. C. Hesler 16565
19. Pileus olive to buffy olive, disc
olive brown.....89. C. Sm. 27472
19. Pileus typically yellow at least at first.....20
20. Bulb marginate depressed at first.....21
20. Bulb oblique.....22
21. Lamellae caesious at base, iridescent and
sulphur-olive near end on margins, staining
reddish brown on edges where bruised...79. C. 36086
21. Pileus pale yellow on faces and base, becoming
deep ferruginous orange in age.....94. C. fulgens
22. Spores 9-11(12) x 5.5-7 μ (see C. orichalceus
var. luteifolius also).....95. C. 19472
22. Spores 11-14 x 7-8 μ23
23. Gill trama ochraceous in KOH.....91. C. elegantior
23. Gill trama vinaceous gray in KOH.....93. C. 20930

Key to Section Violacei

1. Spores 5-10 (11) long.....2
1. Spores 9-15 μ or more long.....39
2. Bulb depressed between margin and stipe
at least in young stages, often broad
and saucer like.....3
2. Bulb marginate by a flange, never depressed
or at best only doubtfully so.....18
3. Pileus whitish to yellow, pale buff or
pale clay color (if whitish from being
under leaves see next choice).....4
3. Pileus with other colors.....7
4. Lamellae pale pinkish lilac to pinkish
lilac; pellicle pink in KOH.....5
4. Lamellae truly violaceous; pellicle not
always pink in KOH.....6
5. Pileus bright yellow ("amber yellow" to "straw
yellow"); lamellae with a reflection of lilac
("pale vinaceous fawn").....96. C. 26949
5. Pileus very pale alutaceous ("pinkish buff")
young, darkening to alutaceous ("pinkish buff");
lamellae truly pinkish lilac to purplish
lilac at first.....97. C. "sodagnitus"
6. Pileus ocher yellow to citron
yellow.....98. C. calochrous
6. Pileus pale alutaceous becoming clay
color.....99. C. Sm. 20927

7. Pileus dark purplish brown but disc usually covered by greenish yellow universal veil remnants.....100. C. citrinipedes
7. Not as above.....8
8. Flesh pale alutaceous in buttons and often darker in mature caps; cap surface dark violaceous, and with matted universal veil remnants over surface.....101. C. calyptratus
8. Not as above.....9
9. Pileus colors greenish blue except for clay color to tawny olive disc.....102. C. Sm. 27312
9. Not as above.....10
10. Pileus violaceous, violaceous gray, lavender, lilac, etc.....11
10. Pileus gray to olive-brown to violaceous brown or clay color at first.....16
11. Pileus 8-14 cm. broad; lamellae pale violaceous to violaceous-white at first.....103. C. michiganensis
11. Pileus smaller; lamellae bright violet, pinkish lilac, deep lavender, etc.....12
12. Pileus violaceous gray.....109. C. 26872
12. Pileus purplish, soon deep vinaceous brown.....108. C. 27206
12. Pileus bright violet to lilac.....13
13. Pileus pale violet and finally fading to whitish; lamellae pale pinkish lilac; pellicle pink in KOH.....104. C. olympianus

13. Not as above.....14
14. Pileus with a conspicuous mat of universal
veil fibrils over disc, color deep
lavender.....105. C. 20775
14. Pileus glabrous, pale violet.....15
15. Pileus on aging becoming vinaceous
brown (pallid if covered by leaves)
(see C. 27206 also).....106. C. Sm. 35850
15. Pileus on aging becoming clay
color.....107. C. 20931
16. Pileus violaceous brown; lamellae
dark lavender.....109. C. Sm. 26872
16. Not as above.....17
17. Pileus grayish brown becoming clay
color; gills caesious.....110. C. 36109
17. Pileus dingy olive-brown to tawny
olive; lamellae violaceous becoming
olivaceous.....111. C. herpeticus
18. Lamellae violaceous becoming green
or olivaceous.....112. C. scaurus
18. Not as above.....19
19. Some portion of carpophore changing to
purplish or lilac when bruised.....20
19. Not as above.....24
20. Spores 8-10 x 7-8.5 μ 113. C. sphaerospermus
20. Spores narrower in relation to length.....21
21. Odor subspermatie as in some
Inocybe species.....115. C. Sm. 24169

21. Not as above.....22
22. Pileus violaceous fading to violaceous
gray; stipe concolorous with
pileus.....114. C. occidentalis
22. Not as above.....23
23. Pileus purple umber becoming streaked
with clay color.....116. C. purpurascens
23. Pileus tinged purple at first but
soon yellow ocher to ochraceous
tawny with smoky brown
stains.....117. C. subpurpurascens
24. Taste of flesh bitter.....25
24. Taste Leriota-like.....118. C. Burke-BZ
24. Taste mild.....27
25. Bulb surrounded by a volva-like sheath
of veil fibrils; pileus grayish
violaceous.....119. C. volvatus
25. Not as above.....26
26. Staining yellow in bulb when cut.....121. C. 27909
26. Not as above.....120. C. albescens
27. Pileus some shade of violaceous and
color somewhat persistent (color changing
in age or on drying in some).....28
27. Pileus, if with violet tints at first
these soon vanishing.....33
28. Stipe 3-4 cm. thick at apex, bulb up to 6 cm.
broad; surface of cap often covered by a
layer of lilac white mycelium.....121. C. Sm. 27909

28. Stipe not with above dimensions.....29
29. Bulb surrounded by a whitish volva-like
sheath with its torn edge often appressed
against the stipe above the bulb; pileus and
flesh "light quaker drab".....119. C. volvatus
29. Not as above.....30
30. Pileus with dull lilac universal veil
patches on the disc, surface dull
lilac and slowly becoming dark lilac
brown.....122. C. 36151
30. Not as above.....31
31. Pileus gills and stipe very dark
violaceous and in age usually showing
changes to olivaceous or olive gray;
not cespitose.....123. C. subsolitaris
31. Not as above.....32
32. Pileus gills and stipe
cinereous.....124. Hesler-17220
32. Pileus bright lilac fading to whitish;
lamellae light pinkish lilac; bulb
staining cinnamon buff where
handled.....125. C. Sm. 27216 & Sm. 27219
32. Pileus violaceous becoming smoky olive
gray and streaked; densely cespitose in
arcs in frondose woods.....126. C. aggregatus
33. Spores $5.5-7 \times 3.5-4 \mu$127. C. 31408
33. Spores larger.....34

34. Pileus vinaceous brown becoming
cinnamon brown, margin violaceous
at first.....128. C. Sm. 19623
34. Not as above.....35
35. Pileus yellow, in age deeper
yellow.....129. C. glaucopoides
35. Not as above.....36
36. Pileus usually with a mixture
of yellow, olive and bluish
colors.....130, 131, 132. C. glaucopus & forms
36. Pileus pale pinkish buff to cinnamon
buff or soon becoming so.....37
37. Odor of Calvatia gigantea.....133. C. Sm. 33070
37. Odor not distinctive.....38
38. Stipe white to whitish.....134. C. Sm. 27356
38. Stipe \pm concolor with gills near
apex.....125. C. Sm. 27219 & 27216
39. Spores 13-18 μ or more long.....40
39. Spores not over ¹⁵1.5 μ long, usually
10-14 μ42
40. Pileus vermillion red to orange
fulvous.....135. C. rubens
40. Pileus some other color.....41
41. Spores 6-8.5 μ wide.....136. C. 20023
41. Spores 8-10.5 μ wide.....137. C. 36146
42. Bulb typically depressed-marginate.....43
42. Bulb typically oblique.....62

43. Pileus truly yellow to olive-yellow or buff when young.....44
43. Pileus at first essentially lilac to violaceous or bluish green, some may become clay color to tawny olive in age.....52
43. Pileus not as above, often whitish to alutaceous.....57
44. Pileus bright yellow and hardly changing; lamellae "pale vinaceous fawn".....96. C. 26949
44. Not as above.....45
45. Pileus bright yellow, staining rusty and finally rusty brown, pellicle not purple in KOH.....63. C. 35902
45. Not as above.....46
46. Pileus Isabella color becoming Saccardo's umber.....138. C. Sm. 31587
46. Not as above.....47
47. Pileus "capucine orange" or with "Mikado orange" streaks; cuticle lilac in KOH.....139. C. amnicola
47. Not as above.....48
48. Pileus yellow at first, becoming tawny to purplish; cuticle red to dull purple in KOH.....49
48. Not as above.....50
49. Spores 10-12 x 6-7 μ ; pileus finally dark purplish red.....164. C. 24994

49. Spores 11-15 x 7-8.5 μ ; pileus reddish
tawny.....140. C. Atkinsonianus
50. Pileus bluish-violaceous fading
quickly to yellow; spores 12-14 x
6-7 μ141. C. caerulescens sensu Kauff.
50. Not as above.....51
51. Spores 11-13 x 6.5-8 μ , subelliptic in side
view.....142. C. lilacinopes
51. Spores 9-12.5 x 5-6.5 μ , narrowly in-
equilateral in side view (check 21206
also).....142a, 143. C. metarius
52. Pileus lilac with a greenish cast, disc
dingy clay color at maturity.....144. C. Sm. 20028
52. Not as above.....53
53. Fruiting body uniformly violaceous and
usually with white patches of
universal veil tissue left on
cap.....145. C. calypetrodermus
53. Not as above.....54
54. Spores 11-14 x 7-8 μ146. C. 35901
54. Spores 9-12 μ long.....55
55. Odor strong and resembling that of
Clitocybe nibularis.....147. C. 36154
55. Not as above.....56
56. Gills pale vinaceous fawn (obscurely
lilaceous) at first (see C. 20931
also).....148. C. arenicola

56. Gills truly violaceous to lilac.....
149,150,151. C. caesiocyaneus & Sm. 36088 & Sm. 27555
57. Pileus tawny red; some basidia pink
in KOH.....152. C. purpureophyllus
57. Not as above.....58
58. Pileus pinkish lilac ("livid pink");
lamellae pale Lobelia pink to
vinaceous lilac.....153. C. Sm. 27208
58. Not as above.....59
59. Pileus violaceous gray to a pale
olive gray at first.....155. C. Sm. 27751
59. Pileus whitish to pinkish buff or
slightly more alutaceous.....60
60. Spores 12-14 μ long.....C. 21186
60. Spores 9-11 μ long.....61
61. Pileus "pinkish buff" in buttons,
darkening to cinnamon buff at least
on disc; lamellae "pinkish lilac" to
"purplish lilac".....97. C. "sodagnitus"
61. Pileus whitish on margin young; lamellae
"pale vinaceous lilac" at first...154. C. Sm. 24848
62. Pileus yellow to ferruginous yellow
at maturity.....63
62. Pileus some other color (lilac, buff,
olive to olive yellow, etc.....65
63. Pileus corrugated.....156. C. corrugatus
63. Pileus not as above.....64

64. Spores 9-12 μ long; lamellae "Lobelia
lilac" (see C. 21206 also).....157. C. Sm. 27470
64. Lamellae Hay's lilac to pale
lilac..... 158. C. odoratirus
64. Spores 11-14 μ long; lamellae
violaceous.....159. C. arquatus sensu Kauff.
65. Pileus vinaceous lavender to deep
vinaceous lavender young, soon
"orange cinnamon".....160. C. Sm. 26869
65. Not as above.....66
66. Pileus grayish violaceous, changing slowly
and with olive showing.....161. C. subolivascens
66. Not as above.....67
67. Spores 11-14 x 6-8 μ , elliptic or nearly
so in face view.....162. C. pseudo-arquatus
67. Not as above.....68
68. Odor sweetly fragrant as in
C. percomis.....163. C. 36150
68. Odor not distinctive.....69
69. Pileus olive to olive yellow young.....70
69. Pileus differently colored.....71
70. Pileus purplish red in age.....164. C. Sm. 24994
70. Pileus dark olive brown or more
yellowish in age.....165. C. 35903
71. Pileus bay to chestnut
young.....166. C. subpurpureophyllus

71. Pileus yellow when young but changing
to dingy brown in cinnamon brown
series, margin often remaining
yellow.....167. C. 36094
71. Pileus different than in above choices.....72
72. Pileus dull purplish umber becoming
army brown (deep vinaceous brown)...168. C. Parksiana
72. Not as above.....73
73. Pileus near Sayal to Verona brown.....74
73. Pileus paler and pinkish cinnamon
or vinaceous buff.....75
74. Gills unchanging when bruised.....170. C. Sm. 27352
74. Young gills readily staining purple
when bruised.....169. C. Sm. 26708
75. Stipe pallid lilac within..... 171. C. Bouderi
75. Stipe white within; gills white or
nearly so at first.....172. C. latus
75. Stipe white within; gills with
doubtful tint of violet-gray to
lilaceous.....55. C. 35695

Subgenus Phlegmacium

Pileus viscid, stipe dry and equal to clavate bulbous but
bulb not marginate

- A. Spores (9) 10-12 μ or more long (some
9-11 μ long.....Section Macrospora p. 28
- A. Spores 8-10 (11) μ long or
shorter.....Section Microspora p. 32

Key to species of

Section Macrospora

1. Lamellae pallid to brownish at first.....2
1. Lamellae yellow to olive at first (but
see C. saginus and C. cliduchus also).....13
1. Lamellae lilac to violaceous at first.....17
2. Stipe typically 8-15 cm. long at maturity.....3
2. Stipe shorter.....10
3. Pileus lilac at first; odor
fragrant.....173. C. balteato cumatilis
3. Pileus in ochraceous to rusty brown series.....4
4. Stipe at maturity showing remains of a
colored (yellow to tawny) universal veil.....5
5. Spores 11-14 x 6.5-8 μ177. C. triumphans
5. Spores 8-10 (11) x 5-6 (7) μ178. C. coloratus
6. Remains of cortina and universal
veil thin and relatively inconspicuous.....7
6. Remains of veils copious.....8
7. Lamellae brownish cinnamon; pileus reddish
yellow; spores 10-13 x 5.5-6.5 μ176. C. ophiopus

7. Lamellae pallid but soon dingy yellow;
pileus olive ocher to yellow ocher;
spores 9-11 x 5-6.5(7) μ180. C. saginus
8. At maturity pileus cinnamon brown to
russet; stipe typically massive (10-13 x
2-3 cm.).....179. C. crassus
8. Pileus typically yellow to pale tawny.....9
9. Lamellae pallid brown young; stipe
remaining white.....174. C. 19072
9. Lamellae whitish to yellowish; stipe
dingy yellow in age.....181. C. cliduchus
10. Odor resembling that of
green corn.....182. C. Sm. 30696
10. Odor not as above.....11
11. Pileus lilac and scarcely changing;
universal veil and cortina white...183. C. Sm. 20934
11. Pileus lilac but soon changing to dull
vinaceous brown at least on disc; veil
violet and leaving violet fibrils over
base of stipe.....184. C. balteatus
11. Pileus tileul buff at first.....185. C. Burke ED
11. Pileus yellow to buff.....12
12. Stipe with copious remains of white veil
remnants (cortina and universal
veil).....186. C. Sm. 20025
12. Stipe with pale yellow veil
remnants.....253. C. luteoarmillatus

12. Veil remnants scanty.....
.....see 174. C. 19072 and 175. C. Hesler 16568
13. Odor distinctive.....14
13. Odor not distinctive.....15
14. Odor aromatic; pileus honey yellow
in age.....187. C. percomis
14. Odor of fresh green corn; pileus dark
vinaceous brown in age.....188. C. superbus
15. Lamellae olive at first.....189. C. olivaceus
15. Lamellae yellow at first.....16
16. Pileus pale fuscous to smoky
brown.....190. C. luteofuscus
16. Pileus pale ochraceous
tawny.....191. C. phyllophilus
17. Changing color in some part when
cut or bruised.....18
17. Typically unchanging.....19
18. Pileus clay tinged, then buffy brown;
flesh whitish but changing to blackish
purple when cut or
bruised.....192. C. porphyropus sensu Kauff.
18. Pileus violaceous; flesh in bulb
staining wine red when cut or bruised
(see C. cyanites also).....193. C. Sm. 32524
18. Base of stipe staining yellow when
bruised.....200. C. largus sensu Kauff.

19. Pileus "Isabella color" to "light brownish olive" spotted "Dresden brown"; stipe 10-15 cm. long, with a rounded bulb; growing on sphagnum.....194. C. sphagnophilus
19. Not as above.....20
20. Pileus Natal brown to Mikado brown (vinaceous brown).....195. C. substriatus
20. Not as above.....21
21. Pileus yellow to clay color or tawny.....22
21. Pileus lilac and if changing then dull brown in age.....24
22. Lamellae merely caesious at first.....196, 197. C. claricolor
22. Lamellae distinctly vinaceous lilac to vinaceous lavender.....23
23. Pileus clay color; spores \pm ellipsoid 11-14 \times 7-8 μ198. C. cyanopus
23. Pileus yellow ocher at first; spores somewhat inequilateral in side view, 10-12 \times 5-6 μ199. C. varius
24. Pileus purple drab to vinaceous drab, becoming deep vinaceous brown; odor none..... 201. C. varicolor
24. Pileus bright lilac, becoming clay color or pallid; odor fragrant.....173. C. balteatocumatilis
24. Pileus lilac, when dried light ochraceous salmon.....202. C. Hesler-17118

Section Microsporae

1. Pileus deep vinaceous brown staining coffee color or darker; flesh avellaneous, staining coffee color.....203. C. 31762
1. Not as above.....2
2. Lamellae pallid whitish or vinaceous buff at first.....3
2. Lamellae yellow, olive or brownish at first.....13
2. Lamellae caesious to violaceous or lilac at first, often fading quickly.....24
3. Pileus bay red to dark brownish red; stipe scaly spotted; spores 7-9 x 5-6 μ 204. C. maculipes
3. Not as above.....4
4. Lamellae vinaceous buff to fawn color (tinged vinaceous); pileus dull vinaceous brown.....205. C. Sm. 27691
4. Not as above.....5
5. Taste of pellicle very bitter...206. C. crystallinus
5. Not as above.....6
6. Stipe typically less than 10 mm. thick.....7
6. Stipe 1-3 cm. thick.....8
7. Stipe white in cortex.....207. C. communis
7. Stipe clay color in cortex.....216. C. Sm. 24948
C. Sm. 26877
8. Pellicle wine red in KOH (in revived material only in spots).....208. C. Sm. 8705

8. Pellicle not as above.....9
9. Stipe with a pale vinaceous brown sheath
over base; spores 6-7 x 3.2-3.6 μ ,
nearly smooth209. C. Sm. 31136
9. Universal veil absent or very thin;
cortina scanty.....210. C. Sm. 15843
9. Universal veil and cortina copious
and white.....10
10. Pileus becoming chestnut on disc and
tawny near margin; scattered to gregarious;
spores 8-10 x 5-6 μ211. C. turmalis
10. Pileus paler; spores smaller.....11
11. Spores 7-9 x 3-4 μ ; odor fragrant as in white
polypores (yeasty); cespitose.....212. C. Sm. 30854
11. Spores wider; no odor; scattered
to gregarious.....12
12. Pileus 5-10 cm. broad, ochraceous
tawny.....213. C. Sm. 19071
12. Pileus 2-5 cm. broad, whitish or disc
merely tinged buff.....246. C. Sm. 26906
13. Pleurocystidia present.....214. C. subtortus
13. Pleurocystidia absent.....14
14. Spores typically 7-9 x 4.5-5.5 μ15
14. Spores typically 7-8 x 5.5-7.5 μ20
15. Stipe 5-10 (15) mm. thick.....16
15. Stipe 10-30 mm. thick.....18
16. Stipe clay color except for pallid
apex.....216. C. Sm. 24948

16. Stipe white.....17
17. Spores 3.5-4.2 μ wide.....215. C. corruscans
17. Spores 5-5.5 μ wide.....217. C. Sm. 35909
18. Lamellae "pale olive buff" young; base
of stipe lilac at first.....218. C. Hesler 17195
18. Not as above.....19
19. Pileus orange cinnamon becoming dark
vinaceous brown.....219. C. corrugis
19. Pileus yellow to tawny.....220. C. Sm. 30766
20. Pellicle of pileus bitter....221, 222. C. infractus
20. Not as above.....21
21. Lamellae olivaceous to brownish olive.....22
21. Not as above.....23
22. Stipe 10-15 cm. long.....223. C. longipes
22. Stipe 3-7 cm. long.....224. C. glutinosus
23. Pileus virgate with red
fibrils.....225. C. virgatus
23. Pileus hoary to virgate but fibrils pallid;
odor & taste raphanoid.....226. C. Sm. 33009
24. Spores broadly ellipsoid to subglobose.....25
24. Spores typically ellipsoid to inequilateral.....32
25. Pileus cinereous, becoming yellowish in
age.....227. C. lapidophyllus
25. Pileus not as above.....26
26. Pileus dull vinaceous becoming deep
violaceous brown; fibrils of universal
veil on stipe pallid but becoming
cinnamon buff.....228. C. Sm. 19738

26. Not as above.....27
27. Pileus lilac white.....242. C. 20640
27. Not as above.....28
28. Universal veil remnants vinaceous tawny;
pileus dark reddish brown.....229. C. Sm. 28286
28. Pileus yellow to tawny.....29
29. Spores 8-10 x 7-9 μ 230. C. albidipes
29. Spores smaller.....30
30. Stipe with orange buff zones of universal
veil; bluish in apex.....231. C. caesiellus
30. Not as above.....31
31. Lamellae caesious to pallid gray; stipe
obscurely spotted with ochraceous shreds
of veil.....232. C. decoloratus
31. Lamellae distinctly vinaceous; no
universal veil evident.....233. C. copakensis
32. Some part of fruiting body changing
color when bruised.....33
32. Fruiting body unchanging when bruised.....37
33. Stipe 2-3.5 cm. thick, clavate; flesh
slowly changing to livid brown when
bruised.....234. C. cyanites
33. Not as above.....34
34. Spores 8-10 x 3-4.5 μ35
34. Spores 7-10 x 5-6 μ36
35. Odor strong resembling
Glitocybe nebularis.....235. C. Sm. 36187

35. Odor none.....236. C. Sm. 36122
36. Pileus gills & stipe concolorous
and dull violaceous; growing single
to scattered.....237. C. mutabilis *Smith*
36. Pileus cinnamon buff on disc, margin
pale bluish drab, disc finally grayish;
odor pungent-aromatic; gregarious-
subcespitose.....238. C. Sm. 19281
36. Pileus "dark grayish lavender" to
"dark lavender", becoming dingy cinnamon
brown over all; odor subspermatoc as in
Inocybe; cespitose.....239. C. Sm. 24295
36. No odor or taste.....C. 28068
37. Odor heavy-aromatic to subfoetid;
stipe with a bluish lavender
fibrillose sheath.....240. C. subfoetidus
37. Not as above.....38
38. Pileus lilac to violaceous at first.....39
38. Pileus not as above or if so soon
changing.....42
39. Spores 6-7 x 3.5-4 μ241. C. 26882
39. Spores broader.....40
40. Spores 6-7.5 x 5-6.5 μ242. C. 20640
40. Spores 7-9 x 4.5-6 μ41
41. Stipe white over lower half from dense
coating of veil remnants.....243. C. Sm. 19947

41. Stipe violaceous over all and whitish
only from fading.....244. C. croceoceruleus
42. Pileus "bone brown" to "Verona brown"
young, margin faintly translucent
striate (see C. substriatus
also).....245. C. Sm. 31588
42. Not as above.....43
43. Pileus whitish at first.....44
43. Pileus colored.....45
44. Spores elliptic in side view.....246. C. Sm. 26906
44. Spores inequilateral in side view.....C. 20787
45. Pileus tawny to russet young; stipe
at first pallid violaceous drab
over all.....247. C. Sm. 32774
45. Not as above,.....46
46. Pileus grayish, often tinged yellow;
stipe white.....248. C. lanatipes
46. Pileus pinkish cinnamon to cinnamon;
flesh of stipe violaceous in
apex,...193a. C. Sm. 930 and 249. C. ellipsoideoceph

C. robustus Beardslee (Elisha Mitchell Jour.
31: 147. 1915.) belongs here?

Subgenus Inoloma

Pileus silky fibrillose to scaly and appearing dry (all species in which the pileus is neither viscid nor hygrophanous are treated here).

- A. Lamellae pallid to avellaneous (grayish brown) when young.....Section Albidifolii p.38
- A. Lamellae caesious, violet, lilac or purple to reddish purple-brown.....Section Canini p.42
- A. Lamellae cinnamon buff, yellow, orange, clay color, alutaceous olive brown to dark rusty brown.....Section Annulati p.49
- A. Lamellae some shade of red to reddish orange at first.....Section Sanguinei p.60

Section Albidifolii

- 1. Spores (9) 10-12 μ or more long.....2
- 1. Spores smaller (up to 8-10 μ long).....7
- 2. Stipe 2-4 mm. thick; spores 15-16 x 8-9 μ250. C. sericeipes
- 2. Spores 9-13 x 5-7 μ ; stipe 1-1.5 mm. thick.....251. C. conicatus
- 2. Not as above.....3
- 3. Pileus covered by dense squarrose scales; stipe also scaly.....252. C. squarrosus
- 3. Not as above.....4
- 4. Universal veil remnants on stipe yellowish or soon becoming yellowish.....5

4. Universal veil if present remaining white.....6
5. Spores 5-6 μ broad; pileus subviscid
and glabrous.....253. C. luteoarmillatus
5. Spores 4.5-5.5 μ broad; pileus soon
lacerate-scaly.....254. C. 35916 (Chmielewski)
6. Cap fibrillose scaly with gray fibrils at
first; lamellae subdistant.....255. C. griseus
6. Cap at first appressed fibrillose
and white silky; lamellae close to
subdistant.....256. C. canescens ✓
7. Spores 6-8 x 5-6 to 8-10 x 7-8 μ8
7. Spores not so wide in relation to length.....11
8. Spores 8-10 x 7-8 μ ; odor slightly of
radish.....257. C. albidoavellaneus
8. Spores smaller.....9
9. Pileus and stipe cinnabar
red.....258. C. bolaris var. holosanguineus
9. Pileus not red.....10
10. Pileus whitish tinged ochraceous; stipe
with yellowish veil remnants.....259. C. abidifolius
10. As above, but universal veil white;
stipe marginate.....260. C. laticeps
10. Pileus avellaneous to wood brown or
darker violaceous brown.....261. Sm. 27692
11. Pileus with saffron to cinnabar
scales.....262. C. bolaris
11. Not as above.....12

12. Stipe 2-4 mm. thick.....13
12. Stipe thicker.....14
13. Pileus chestnut, the umbo
blackish.....263. C. castanellus
13. Pileus alutaceous.....264. C. modestus
14. Pleurocystidia present.....15
14. Pleurocystidia absent.....16
15. Pileus alutaceous to russet; gills
not staining.....265. C. subaustralis
15. Pileus pallid at first; gills staining
yellow to reddish.....392. C. pseudobolaris
16. Pileus violaceous gray, avellaneous,
drab, etc.....17
16. Pileus yellow to ochraceous or fulvous.....22
17. Lamellae avellaneous young; odor and
taste raphanoid.....266. C. Sm. 33865
17. Not as above.....18
18. Universal veil well developed; pileus
8-17 cm. broad.....19
18. Not as above.....21
19. Stipe with a marginate bulb 4-6 cm. thick;
pileus finally vinaceous drab.....267. C. regalis
19. Not as above.....20
20. Stipe pale violaceous at first; pileus
sepia brown at first, fading to pinkish
cinnamon.....565. C. plumiger

20. Stipe whitish young; pileus also
whitish.....268. C. pinetorum (Sm. 17510)
21. Stipe marginate bulbous; pileus often
rimose along the margin; spores
7-8 μ long.....270. C. subrimosus
21. Spores 8-11 μ long; stipe lilac
gray.....269. C. Burke DA
21. Stipe clavate; pileus not
rimose.....271. C. pinetorum sensu Kauff.
22. Cap surface tomentose to plush
like, color tawny olive, old gold
or Dresden brown; stipe in some with
tawny olive veil remnants.....272. C. colymbadinus
22. Not as above.....23
23. Pileus 5-10 cm. broad, pale yellow or
buff; cespitose.....273. C. cespitosus
23. Pileus ivory white.....274. C. decumbens
23. Pileus pinkish buff, becoming clay
color.....275. C. turgidus
23. Pileus ochraceous orange
mature.....276. C. subaurantiacus

Section Canini

1. Spores (9) 10-12 μ or more long.....2
1. Spores up to 8-10 μ long.....13
2. Spores 12-17 μ long.....3
2. Spores 9-12 μ long.....4
3. Pileus silky, brownish lilac or yellowish
stained.....277. C. Braendlei
3. Pileus violaceous and fibrillose scaly
at least over disc.....278. C. violaceus
4. Stipe with an oblique-marginate
bulb.....279. C. obliquus
4. Stipe clavate to equal.....5
5. Pileus whitish to reddish-cinereous to
vinaceous brown (see C. rimosus also).....6
5. Pileus not as above.....8
6. Staining vinaceous lavender on gills
when bruised; spores 5-6.5 μ
broad.....280. C. Hesler 17072
6. As above but spores 6-8 μ
broad.....281. C. purpureocarneus
6. Not as above.....7.
7. Lamellae dingy violaceous.....282. C. rubrocinereus
7. Lamellae dark purple; odor
lacking.... 283. C. pulchrifolius var. pulchrifolius
8. Universal veil remnants over lower
part of stipe buff colored; cap
2-4 cm. broad.....285. C. 31135

8. Universal veil remnants lilac to pallid;
pileus 4-10 (12) cm. broad.....9
9. Gills reddish lilac young; odor strong of
rotten potatoes.....286. C. hircinus (Sm. 33519)
9. Not as above.....10
10. Pileus appressed fibrillose scaly and
dark violet purple; lamellae concolorous
with pileus.....287. C. 31109
10. Not as above.....11
11. Pileus silvery violaceous and hardly
changing, not rimose.....288. C. Hesler 17068 ✓
11. Not as above.....12
12. Pileus glabrous, becoming
rimose.....289. C. rimosus
12. Pileus silky fibrillose, also
rimose.....290. C. 35400
13. Spores subglobose (6-8 x 5.5-7 μ).....14
13. Spores narrower in relation to length.....22
14. Pileus distinctly scaly or squamulose.....15
14. Pileus glabrous to appressed fibrillose.....16
15. Pileus ochraceous beneath the scales..291. C. asper
15. Pileus dark brown with purple tinge, soon
chocolate brown over all.....292. C. squamulosus
16. Stipe 1-2 cm. thick at apex and
Universal veil remnants yellow to
cinnamon buff; pileus 4-10 cm.....17
16. Not as above.....18

17. Pileus at first clay color to
cinnamon buff.....293. C. caesiifolius
17. Pileus violaceous gray soon becoming
dull reddish brown, often remaining
violaceous on margin.....294. C. caninus
18. Pileus and stipe with fibrils which
stain vinaceous brown to vinaceous red;
fibrils of stipe yellow at first;
stipe equal..... 295. C. 30815 & Sm. 26721 (296)
18. Pileus purplish lilac, not staining;
lamellae deep purple; stipe clavate and
base staining red where handled.....297. C. 35937
18. Not as above.....19
19. Pileus dingy white to
argillaceous.....298. C. brevissimus
19. Pileus violaceous tinted at least on
margin.....20
20. Gills deep blue; universal veil
copious.....299. C. Sm. 30651
20. Gills caesious to violaceous; universal
veil if present not copious.....21
21. Universal veil remnants on lower part of
stipe dingy ochraceous.....300. C. anomalus
21. Not as above -- stipe clavate at maturity;
gills lilac; pileus 3-6 cm. broad and
lilac white over all.....242. C. 20640
22. Stipe 2-3 mm. thick; lamellae
distant.....301. C. lacorum

22. Stipe 5-20 mm. thick23
23. Pileus squarrose, the hairy scales tawny
to dark brown in color; stipe with similar
scales over lower part.....302. C. pholideus
23. Not as above.....24
24. Pileus whitish at first, becoming yellowish
to vinaceous brown in some (see C.
subpulchrifolius also).....25
24. Pileus lilac, purple, violet, drab to
caesious at first.....27
24. Pileus at first avellaneous to various shades
of brown, yellow, orange, etc.....40
25. Pileus dingy pallid (whitish) spores
5-6 μ in diam.303. C. brevipes
25. Not as above.....26
26. Pileus white at first but becoming wood
brown to cinnamon drab or in age viola-
ceous umber.....304. C. Sm. 26895
26. Pileus whitish at first, disc finally
cinnamon buff.....305. C. Sm. 79384
27. Odor faetid and disagreeable....306. C. camphoratus
27. Taste Lepiota-like.....118. C. Burke BZ
27. Not as above.....28
28. Odor distinctly fragrant (if resembling
radishes or raw potatoes see choice 30).....29
28. Not as above.....30
29. Flesh pallid to lilac (see C.
pyriodorus also).....307. C. fragrans

29. Flesh dull cinnamon.....308. C. traganus
30. Lamellae subdistant; clavate bulb of
stipe 2-4 cm. thick.....309. C. lilacinus
30. Not as above.....31
31. Odor of raw potatoes.....310. C. Sm. 19373
31. Not as above.....32
32. Pileus silvery avellaneous;
spores 8-10 x 5-5.5 μ311. C. Hesler 17218
32. Pileus silvery avellaneous;
spores 6-7 x 4.5 μ312. C. Burke 68
32. Not as above.....33
33. Stipe typically clavate.....34
33. Stipe essentially equal.....35
34. Stipe peronate with a thin white
universal veil..... 313. C. alboviolaceus
34. Stipe fibrillose only from
cortina 314. C. argentatus sensu Kauff.
35. Lamellae dull to bright purple.....36
35. Lamellae pallid violet to lilac.....37
36. Pileus bright purple; stipe changing to
vinaceous brown where cut, no conspicuous
universal veil remnants.....315. C. 31770
36. Pileus grayish buff, caesious along
margin; stipe with a conspicuous boot (of
veil elements) or this breaking into zones,
not staining.....316. C. subpulchrifolius
37. Stipe 6-12 cm. long, with a basal white
fibrillose annulus.....317. C. Sm. 30179

(= My # 24942)

37. Not as above.....38
38. Odor and taste slightly raphanoid.. 318. C. 36182
38. Not as above.....39
39. Pileus silky shining and dry...319. C. subtabularis
39. Pileus glabrous, and at maturity
areolate-marked.....320. C. 35910
40. Spores 8-10 x 6-7.5 μ321. C. Sm. 31287
40. Spores not over 6 μ wide.....41
41. Odor and taste of radish.....322. C. Stewartii
41. Not as above.....42
42. Universal veil remnants on lower part of
stipe white to pallid or lacking.....43
42. Universal veil remnants colored.....45
43. Stipe bulbous with a flaring marginate bulb
(see Hesler 16617 also).....323. C. compressus
43. Stipe equal to clavate.....44
44. Pileus ochraceous orange and
sublubricous.....324. C. Sm. 31430
44. Pileus grayish brown slowly changing
to vinaceous brown.....325. C. Sm. 24950
45. Universal veil remnants cinnabar to
dull vinaceous brown.....326. C. Sm. 31702
45. Veil remnants not as above.....46
46. Pileus glabrous, "Rood's brown" to
"warm sepia" young (deep
vinaceous brown) spores 8-10 x
5-6 μ327. C. 31591

46. Pileus "Sabal brown" (cinnamon);
spores 7-8 x 4.6-5.2 μ328. C. 34032
46. Pileus coated with grayish cinnamon-
buff fibrils, snuff brown beneath
them; stipe dingy ochraceous in
base in age; spores 7-9 x
5-5.5 μ329. C. 36041

Section Annulati

- A. Spores globose, subglobose or
varying to very broadly
ellipsoid.....Subsection Sphaerospori p. 49
- A. Spores longer in relation to
their ^{breadth} length.....Subsection Cinnamomei p. 54

Subsection Sphaerospori

1. Basidia with bright greenish yellow
granules (revived in KOH); stipe white
changing to saffron red when handled;
bulb up to 3.5 cm. thick.....330. C. rubroclavus
1. Stipe changing to vinaceous brown
bruised.....331. C. Burke EK
1. Not as above.....2
2. Universal veil absent or at least not
leaving colored zones on the stipe.....3
2. A colored universal veil present leaving
a sheath or zones on the stipe.....6
3. Pileus and stipe concolorous
(olive).....332. C. Sm. 24611
3. Pileus dominantly yellow.....4
4. Pileus distinctly fibrillose-
squamulose (see C. flavifolius
also).....333. C. 35943 (luteus?)
4. Pileus glabrous to appressed fibrillose.....5
5. Lamellae crowded; pileus becoming
ochraceous orange at least on disc;
spores 7-9 x 5.5-7 μ334. C. Hesler ~~12135~~ #17135

5. Lamellae subdistant; pileus yellow;
spores $6.5-7.5 \times 5-6 \mu$335. C. luteus
6. Veil remnants on stipe Saccardo's umber,
vinaceous, or cocoa brown.....7
6. Veil remnants some other color.....10
7. Veil remnants and pileus "Saccardo's
umber".....336. C. Sm. 18781
7. Not as above.....8
8. Pileus glabrous and appearing moist but
not hygrophanous; lamellae pale
cinnamon brown young; flesh of cap
wood brown to vinaceous buff; veil
vinaceous.....337. C. haematochelis
8. Not as above.....9
9. Flesh pale ivory; lamellae pallid
brownish young.....338. C. UIFP-3166
9. Pileus army brown; flesh army brown
fading to ochraceous tawny; lamellae
ochraceous tawny and hardly
changing.....339. C. Sm. 30818
10. Pileus surface plush like from erect
fibrils or the fibrils grouped to form
erect to strongly recurved scales.....11
10. Pileus appressed fibrillose to silky,
or the fibrils grouped into appressed
to slightly recurved squamules.....18

11. Hyphae on disc of pileus when mounted in KOH either remaining with dark olive content or developing such a colored content.....12
11. Hyphae on disc of pileus, if olivaceous, this color fading quickly in KOH.....13
12. Lamellae dull yellowish brown at first.....340. C. cotoneus
12. Lamellae pallid but soon lutescent.....341. C. clandestinus
13. Pileus color typically olive.....14
13. Pileus more yellow than olive, or else ferruginous.....15
14. Pileus evenly "ecru olive"; universal veil "primrose yellow"; stipe apex pallid yellow.....342. C. Sm. 30812
14. Pileus "brownish olive" to "Saccardo's olive", universal veil olive; stipe pale olive inside and out.....343. C. Sm. 20029
15. Spores 7-9 x 6-7 μ ; lamellae cadmium yellow at first.....344. C. croceocolor
15. Not as above.....16
16. Odor and taste not distinctive...346. C. subnotatus
16. Odor and/or taste of radish.....17
17. Young pileus sulphur yellow, showing tints of salmon where cuticle has split; universal veil very thin and inconspicuous..... 333. C. 35943 (luteus?)

17. Young pileus more golden yellow than
above choice; no color change noted
in the flesh; universal veil well
developed to the degree of leaving
a thin annulus.....345. C. annulatus
18. Odor raphanoid when flesh is crushed.....19
18. Not as above.....20
19. Pileus buckthorn brown young, near
ochraceous tawny in age.....347. Sm. 21851
19. Pileus with appressed dark olive to
blackish fibrils over disc..(old caps of C. cotoneus
key out here)
20. Base of stipe staining rusty
brown.....348. C. Whitei & 32772 (349)
20. Not as above.....21
21. Pileus ochraceous orange and becoming
brighter in age.....350. & 351. C. callisteus
21. Not with above color and pattern
of color change.....22
22. Pileus gills and veil Isabella color.....C. 23505
22. Pileus dark olive brown at first; stipe
violaceous in apex.....352. C. Burke CT
22. Not as above.....23
23. Pileus cinnamon buff to clay color,
streaked Mars brown.....353. C. Hesler 17692 also
354. C. Hesler 13820

23. Pileus yellow or over disc fuscous,
sometimes almost entirely yellow
or entirely fuscous.....355. C. 34480

Subsection Cinnamomei

1. Spores 9-11 μ or more long.....2
1. Spores 7-9 (10) μ or less long.....19
2. Spores 10-13 x 3.5-5 μ , boletoid
in shape.....356. C. aureifolius
2. Spores 10-13 x 2.5-3 μ357. C. Singer F-1677
2. Not as above.....3
3. Stipe with vinaceous to cinnabar remains
of universal veil.....4
3. Not as above.....7
4. Fusoid-ventricose to mucronate
cheilocystidia present.....358. C. Parlinii
4. Not as above.....5
5. Pileus densely appressed fibrillose
and vinaceous brown.....359. C. subtestaceus
5. Pileus ferruginous red.....360. C. concinnus
5. Pileus not as above.....6
6. Spores 10-13 x 5.5-7 (7.5) μ361. C. armillatus
6. Spores 8-10.5 x 4.5-5.5 μ
.....362. C. Bullardii (Sm. 24582)
7. Chestnut, bay, tawny or clay color.....8
7. Pileus pale salmon to yellow to olivaceous
to olive brown.....13
8. Odor and taste of radish.....9
8. Not as above.....10
9. Spores 5-6.5 μ in diam.363. C. Hesler 17174
9. Spores 6-8 μ in diam.365. C. rainierensis

10. Lamellae Mars yellow becoming Sanfords
brown (ferruginous red).....364. C. 26715
10. Not as above.....11
11. Pileus russet, chestnut to tawny; lamellae
pale tawny at first.....366. C. orellanus
11. Pileus and gills paler.....12
12. Pileus 1-2 cm.; stipe 2.5-4 mm.
thick.....367. C. Sm. 29497
12. Pileus 6-13 cm.; stipe 10-18 mm.
thick.....368. C. Hesler 16426
13. Spores 10-13 x 5-6 μ ; pileus
apricot buff to salmon buff.....379. C. distortus
13. Spores 9-11 μ long.....14
14. Odor and/or taste of radish (crush flesh).....15
14. Odor and taste not distinctive.....16
15. Pileus ochraceous salmon to apricot
buff.....370. C. suillus
15. Colors more olive yellowish.....371. C. Clelandii
16. Lamellae pallid to pale
ochraceous.....372. C. ochraceus
373. C. Burke CE
16. Lamellae olivaceous or if yellow
developing olive to green tones.....17
17. Stipe with orange fulvous zones of
universal veil remnants.....374. C. 30157
17. Not as above.....18

18. Gills chrysotite green young; some
basidia with red content as revived
in KOH.....375. C. chrysolitus
18. Gills "olive ocher"; no basidia with
red contents when revived in
KOH.....371. C. Clelandii (Sm. 18884)
19. Spores 5-6.5 μ broad (or at least
regularly 5 μ or over broad).....20
19. Spores typically 3-5 μ broad.....33
20. Stipe typically 1 cm. or more thick
at apex.....21
20. Stipe thinner.....25
21. Pileus whitish to grayish or avellaneous.....22
21. Pileus not as above.....23
22. Spores 7-8.5 x 5-6 μ ...376. C. pinetorum (Sm. 26717)
22. Spores 8-10 x
5-6 μ377. C. Sm. 19129 & 24756 (378)
23. Lower part of stipe with vinaceous
remnants of universal veil.....379. C. 20639
23. Not as above.....24
24. Pileus dark yellowish brown (mummy
brown to bister).....380. C. 26885
24. Pileus dingy buff to pale yellowish
tawny.....381. C. flavifolius
25. Odor of radish or merely pungent.....26
25. Odor not distinctive.....30
26. Fibrils on disc of pileus dark green in KOH;
stipe not staining at base.....382. C. Sm. 19948

26. Not as above (surface hyphae Isabella color in one).....27
27. Stipe with vinaceous brown to red remains of universal veil (check buttons).....28
27. Not as above.....29
28. Stipe 3-6 mm. thick; cap bright rusty red.....383. C. uliginosus
28. Stipe 8-12 mm. thick; pileus pale cinnamon.....384. C. Hesler 17219
29. Pileus wood brown to Verona brown beneath fibrils; stipe 2-4 mm. thick and bister from base up in age.....385. C. Sm. 28161
29. Gills finally cinnamon rufous (ferruginous red); some basidia pink in KOH and color persistent.....386. C. 24952
29. Gills finally ochraceous tawny; basidia at times pink revived in KOH but quickly fading.....387. C. 34993
30. Universal veil remnants deep lavender.....388. C. Sm. 24754
30. Not as above.....31
31. Lamellae deep vinaceous brown.....389. C. Sm. 29808
31. Lamellae yellow to yellow brown.....32
32. Lamellae olive ocher at first; stipe 4-6 mm. thick.....390. C. 34483
32. Lamellae tawny olive at first; stipe 1-1.5 mm. thick.....391. C. olivaceofulvus

33. Pleurocystidia present; staining yellow and then red in some part.....392. C. pseudobolaris
33. Not as above.....34
34. Pileus fibrillose-squamulose, bright ferruginous; lamellae near ferruginous red at maturity (see C. minsatopus also).....393. C. 24213
34. Pileus grayish drab.....394. C. catskillensis
34. Not as above.....35
35. Colors of pileus in olive yellow, olive brown or olive series.....36
35. Pileus yellow to tawny or yellow brown.....38
36. Odor and taste distinctly raphanoid.....395. C. raphanoides
36. Odor & taste mild to bitter or slightly pungent.....37
37. Lamellae "old gold" young; taste bitter but not lasting.....396. C. Sm. 24609
37. Lamellae Isabella color; taste not bitter at first.....398. & 399. C. Sm. 20158 & Sm. 30987
38. Stipe (♂) 10-15 mm. thick at apex.....39
38. Stipe narrower.....40
39. Pileus pale yellow ("cream buff").....373. C. Burke CE
39. Pileus & lamellae concolorous and (ochraceous tawny).....400. C. 24068

39. Pileus fulvous; lamellae rusty yellow
to golden-fulvous; flesh of cap and
stipe olivaceous.....401. C. malicorius
40. Stipe 2-2.5 cm. long, 5-6 mm. thick;
lamellae pale tawny at first.....402. C. basalis
40. Stipe longer in relation to its length.....41
41. Lamellae yellow ocher; base of stipe with
a pinkish orange tone and with yellow veil
remnants variously disposed.....403. C. 31056
41. Pileus cartridge buff; stipe apex
pale lavender.....397. C. Burke CN
41. Not as above.....42
42. Lamellae saffron yellow verging to
orange at first.....404. C. croceofolius
42. Lamellae bright rusty yellow to dark golden
fulvous; flesh olivaceous.....401. C. malicorius
42. Lamellae antimony yellow or duller and more
ochraceous; flesh yellow.....405. C. cinnamomeus

Section Sanguinei

1. Pileus and stipe concolorous and some shade of red to ferruginous.....2
1. Not as above.....4
2. Spores $6-7.5 \times 5-5.5 \mu$, broadly ellipsoid to subglobose.....258. C. bolaris var. holosanguineus
2. Spores longer in relation to length.....3
3. Spores $9-11 \mu$ long.....C. Singer F-2730 (406)
3. Color cinnabar red.....407. C. cinnabarinus
3. Color blood red.....408. & 409. C. sanguineus
4. Gills and ^(pileus?)stipe deep red, stipe yellow to fulvous...410. & 411. C. phae^oniceus var. occidentalis
4. Not as above.....5
5. Gills blood red, reaction of tissues in KOH blood red, spores $7-8 \times 4.5-5 \mu$...412a. C. semisanguineus var. semisanguineus
5. Gills dark brownish red; reaction of tissues in KOH inky violet; spores as above.....412. C. semisanguineus var. atramentarius
5. Gills dull brownish red; spores $5-6.5 \times 3.5-4 \mu$; KOH reaction inky violet.....413. C. semisanguineus var. microsporus

Subgenus Hygrophanus

Pileus moist when fresh, hygrophanous, surface either glabrous or fibrillose from remains of veil.

Key to sections and subsections

- A. Stipe 4-8 mm. or thicker at apex.....B
- A. Stipe typically thinner (\pm 3-5 mm. or less).....C
- B. Spores 9-11 μ long.....Section Crassipes p. 62
 - Subsection Macrospori p. 62
- B. Spores 8-10 μ long or shorter.....Section Crassipes p. 66
 - Subsection Microspori p. 66
- C. Spores 9-11 μ long.....Section Graciles p. 87
 - Subsection Macrospori p. 87
- C. Spores shorter.....Section Graciles p. 90
 - Subsection Microspori p. 90

Section Grassi

Subsection Macrospori

1. Stipe clavate or if equal typically 10 mm.
or more thick.....2
1. Stipe nearly equal and typically less than
10 mm. at apex.....15
2. Lamellae violaceous at first (in some
fading quickly).....3
2. Lamellae not as above.....6
3. Stipe usually annulate at or near the middle
from remains of pallid membranous universal
veil; lamellae deep purple young and changing
slowly.....414. C. torvus
3. If an annular band present, lilac of
gills showing only in buttons.....4
4. Pileus violaceous at first.....C. 20123
4. Not as above.....5
5. Pileus deep vinaceous brown fading to
wood brown; lamellae subdistant at
maturity.....415. C. Sm. 33346
5. Pileus "Sabal brown" (cinnamon);
lamellae crowded.....C. Hesler 17193
6. Lamellae vinaceous to avellaneous
(grayish) young.....7
6. Lamellae differently colored at first.....9
7. Universal veil remnants cinnamon buff;
spores 6-8 μ broad.....416. C. 35788

7. Universal veil absent or if present
white to pallid.....8
8. Odor resembling scented soap; stipe lacking
remnants from a veil.....417. C. 35779
8. Odor not distinctive; stipe usually with a
white median fibrillose zone.....418. C. Sm. 31589
9. Spores 9-11 x 4.5-5 μ ; caps "russet" to
"Kaiser brown" moist.....419. C. Sm. 26692
9. Spores typically 5-7 μ wide.....10
10. Universal veil present as evidenced by
fibrils or zones on stipe below line
where cortina broke.....11
10. Universal veil absent.....14
11. Universal veil remnants cinnabar to
vinaceous.....361. C. armillatus
11. Universal veil whitish to gray.....12
12. Stipe dark brown like pileus and darkening
more from base up in age; universal veil
gray.....420. C. 35999
12. Stipe paler and not darkening from base
upward in age; universal veil whitish.....13
13. Stipe whitish.....421. C. bivellus
13. Stipe brownish..422. C. brunneofulvus & 35913 (423)
14. Stipe violaceous at least
above.....424. C. ferrugineo-griseus
14. Stipe pallid to cinnamon.....
.....425. C. Sm. 27984 and C. 35329 (426)

15. Violaceous tints present at least in young
gills or apex of stipe (obscure in 24859).....16
15. Not as above.....20
16. Pileus purple drab to lilac or when
faded vinaceous brown or paler.....17
16. Pileus not as above.....18
17. Lamellae close; odor and taste
none.....427. C. Sm. 24670
17. Lamellae distant; odor and taste
of radish.....428. C. evernius
18. Pileus pale pinkish buff beneath
fibrils.....429. C. 35676
18. Pileus chestnut to dark vinaceous brown.....19
19. Lamellae deep vinaceous brown young; pileus
dark violaceous brown.....431. C. Sm. 24859
19. Lamellae pale vinaceous young; pileus
"chestnut" (deep brownish red)....430. C. Sm. 27740
20. Odor of radish.....432. C. Hesler 17248 ✓
20. Not as above.....21
21. Lamellae vinaceous brown young (Roods brown,
Verona brown to fawn color).....22
21. Lamellae cinnamon buff to dull brown.....24
22. Stipe dingy reddish around base where
handled; lamellae "Roods brown"
young.....434. C. Sm. 17736
22. Not as above.....23
23. Stipe ± snuff brown at maturity...433. C. Sm. 24672

23. Stipe in age pale incarnate brown
over all.....435. C. Sm. 27529
24. Universal veil remnants cinnamon
buff.....436. C. Sm. 27159
24. Universal veil remnants white to pallid.....25
25. Pileus "Bay" to "Auburn" or "tawny";
stipe with a median white-fibrillose
annulus.....437. C. Sm. 17787
25. Pileus "cinnamon brown" to "ochraceous
tawny"; stipe as above.....438. C. Sm. 20836
25. Pileus "Verona brown" fading to
"pinkish buff"; lamellae ochraceous
tawny.....439. C. Sm. 24857
440. C. punctatus

Section Crassi

Subsection Microspori

- A. Lamellae drab gray when young
(see 27666 also) 1
- A. Lamellae pallid at first.....Division 2 p.67
- A. Lamellae avellaneous at first.....Division 3 p.68
- A. Lamellae olive to yellow, Saccardo's
umber to ochraceous tawny, or clay
color, cinnamon buff or dull brown,
or cinnamon.....Division 4 p.69
- A. Lamellae vinaceous to vinaceous brown,
vinaceous umber, "cinnamon brown" or
ferruginous.....Division 5 p.76
- A. Lamellae purple violet, lilac or
caesious at first.....Division 6 p.80

Key to Division 1

1. Stipe equal.....441. C. Sm. 27666
1. Stipe with a bulb2
2. Stipe truly violaceous in apex,
bulb clavate.....442. C. Sm. 27596
2. Stipe violaceous brown in apex, bulb
rounded to marginate.....443. C. fumosifolius

Key to Division 2.

(but if collection does not run
down try 4)

1. Spores $6-7.5 \times 5-6 \mu$, subglobose to broadly ellipsoid.....469. C. alutaceofulvus
1. Spores longer in relation to length.....2
2. Universal veil present.....3
2. Universal veil absent.....4
3. Universal veil fawn color.....440. C. mammosus
3. Universal veil pallid.....565. C. plumiger
4. Lamellae becoming "Mars yellow"...493. C. armeniacus
4. Lamellae not as above.....5
5. Spores $8-10 \times 5-6 \mu$6
5. Spores $7-8 \mu$ long.....7
6. Pileus 3-5 cm., bay brown to chestnut.....447. C. subrigens
6. Pileus 4-10 cm., watery cinnamon brown.....445. C. duracinus
7. Pileus 2.5-5 (6) cm., Roods brown to amber brown.....446. C. renidens
7. Pileus 6-15 cm., tawny to russet.....448. C. firmus

Division 3

1. Universal veil present2
1. Universal veil absent.....3
2. Universal veil remnants white to grayish.....449. C. rusticus
2. Veil remnants cinnamon buff or soon becoming so.....451. & 452. C. bovinus
3. Stipe violaceous in apex.....4
3. Not as above.....5
4. Spores 8-10 x 5.5-6.5 μ453. C. Sm. 27410
4. Spores 7-8 x 4-4.5 μ454. C. Sm. 27414
5. Pileus 4-10 cm.; gills close.....455. C. irregularis
5. Pileus 3.5-6 cm.; gills distant.....456. C. Sm. 27845

Division 4

1. Stipe violaceous or only the apex showing this color (often very faint).....2
1. Not as above.....9
2. Spores 3-5 μ wide.....3
2. Spores 5-6.5 μ wide.....4
3. Stipe equal; spores 6-7 x 3-3.5 μ ...457. C. Sm. 27341
3. Stipe clavate; spores 7-8 x 4.2-5 μ458. C. Hesler 17298
3. Stipe equal; spores 7-8 x 4.5-5 μ459. C. gentilissimus
4. Universal veil remnants scanty, pale yellow (see unopened buttons).....460. C. Sm. 28778
4. Universal veil if present white to violaceous.....5
5. Universal veil present.....6
5. Universal veil absent.....8
6. Stipe not darkening from base up.....461. C. Sm. 24757
6. Stipe darkening from base upward.....7
7. Pileus blackish with a purple tinge when young and moist.....462. C. Washingtonensis
7. Pileus dull vinaceous brown at first; spores 6-7.5 μ long.....465. C. Sm. 24902
7. As above, but spores 7-9 μ long.....463. C. Sm. 27531
8. Pileus sooty brown to obscurely olive gray.....466. C. livor
467. C. Sm. 34481

8. Pileus chestnut brown moist.....468. C. laetior
9. Stipe darkening from base upward.....10
9. Stipe not as above.....24
10. Stipe essentially clavate.....11
10. Stipe essentially equal.....16
11. Spores 6-7.5 x 5-6 μ , subglobose.....12
11. Spores longer in relation to width.....13
12. Remnants of universal veil
pallid.....469. C. alutaceofulvus
12. Remnants of universal veil
vinaceous tawny.....470. C. Sm. 19376
13. Universal veil present.....14
13. Universal veil absent.....15
14. Pileus "Verona brown" to "Roods' brown" young;
spores 5-6 μ broad.....463. C. Sm. 27531
14. Pileus \pm cinnamon variegated with wood
brown; spores 4-5 μ broad.....471. C. bulbosus
15. Lamellae dull brown becoming Verona brown;
stipe dark brown.....472. C. 35968
15. Lamellae pinkish buff; stipe pallid and
discoloring to ochroleucouvin base..473. C. Sm. 27744
16. Universal veil lacking.....17
16. Universal veil present.....18
17. Pileus russet to chestnut fading to
cinnamon rufous; stipe whitish at
first.....474. C. Sm. 26626
17. Pileus ferruginous moist; stipe
yellow brown.....475. C. Sm. 26890

18. Lamellae bright yellow; stipe yellow
and staining rusty brown in
base.....476. C. Morrisii
18. Spores 6-7 x 3-3.5 μ457. C. Sm. 27341
18. Spores wider (4-6 μ).....19
19. Pileus translucent striate on margin in
moist mature caps.....20
19. Pileus opaque when moist.....21
20. Lamellae cinnamon buff young.....478. C. Sm. 27510
20. Lamellae pale cinnamon brown.....477. C. 27525
21. Pileus minutely floccose to squamulose
at some stage.....22
21. Pileus glabrous to silky.....23
22. Pileus glabrous at first, with minute
grayish squamules when faded.....479. C. Sm. 31757
22. Pileus floccose to squamulose from
universal veil
elements.....480. C. Sm. 24863 & 23470 (464)
23. Spores 6-7.5 x 4.4-5 μ ; cap often
splitting radially.....481. C. Sm. 20831
23. Spores 7-9 x 4.5-5 μ ; cap not
splitting.....482. C. Sm. 27665
24. Spores 6-8 μ long and typically under
5 μ broad.....25
24. Spores usually both wider and usually longer.....28
25. Pileus "chestnut"; lamellae "amber
brown," stipe \pm clay color.....483. C. helvolus

25. Not as above.....26
26. Stipe 6-15 cm. long; lamellae russet to dark tawny at first.....484. C. damascenus
26. Stipe shorter; lamellae clay color.....27
27. Stipe lacking zones or patches of veil tissue; pileus russet to chestnut brown.....485. C. Sm. 27599
(= My No. 24054?)
27. Stipe often subannulate from white universal veil remnants; pileus walnut brown.....486. C. nigrellus
487. C. Sm. 35045
28. Spores subglobose to broadly ellipsoid.....29
28. Spores longer in relation to length.....31
29. Universal veil lacking; pileus chestnut brown moist, rufous faded.....488. C. dilutus
29. Not as above.....30
30. Pileus glabrous young; odor slightly of radish; lamellae subdistant.....489. C. distans
30. Pileus silky to fibrillose-squamulose; odor none; gills close.....490. C. hemitrichus var. americanus
31. Gills reddish orange young, soon even redder; pileus ferruginous red; stipe dull orange.....491. C. californicus
31. Not as above.....32
32. Lamellae yellow (various tones) when young.....33
32. Lamellae not as above.....36

33. Stipe and young gills pale olive ocher;
pileus olive ocher faded.....492. C. isabellinus
33. Not as above.....34
34. Stipe watery pallid moist, dingy
whitish dry.....493. C. armeniacus
34. Stipe yellow to yellowish.....35
35. Universal veil remnants yellow.....494. C. confusus
35. Universal veil remnants white.....495. C. hinnuleus
36. Lamellae distinctly cinnamon at first.....37
36. Lamellae pallid brownish to ochraceous
tawny series.....42
37. Universal veil remnants brownish to
cinnamon buff.....38
37. Not as above.....39
38. Spores 7-9 x 5-6 μ496. C. subcuspidatus
38. Spores 6-7.5 x 4.5-5.2 μ497. C. Hesler 16427
39. Universal veil white to violaceous.....40
39. Universal veil lacking.....41
40. Spores 8-10 x 5-6 μ498. C. laniger
499. C. errugalus var.
40. Spores 7-8 x 5-5.5 μ500. C. glandicolor
41. Pileus vinaceous brown fading to
pale pinkish cinnamon; spores
8-10 x 4-4.6 μ501. C. 25009
41. Pileus cinnamon brown fading to
ochraceous orange; spores 7-9 x
5-6 μ502. C. angulosus

42. Base of stipe Japan rose; taste
of radish.....503. C. Hesler 17271 43
42. Not as above.....43
43. Universal veil remnants on stipe colored.....44
43. Veil remnants if present pallid to white.....46
44. Veil leaving vinaceous zones on
stipe.....504. C. Sm. 19113 45
44. Veil remnants differently colored.....45
45. Pileus tawny fading to ochraceous orange;
universal veil yellow.....505. C. Sm. 24334
45. Pileus bister fading to dull ochraceous
tawny; veil remnants on stipe cinnamon buff
to ochraceous tawny.....506. C. 26798
46. Stipe with a white fibrillose band or
more than one zone over lower part.....47
46. Stipe naked except for remains of cortina.....51
47. Odor distinctive.....48
47. Odor none or not distinctive.....49
48. Odor soon sweetly fragrant.....507. C. 35153
48. Odor of radish.....508. C. Sm. 21036
49. Stipe 2.5-4 cm. long; pileus at first
with whitish squamules from veil (see
20517 also 541).....509. C. Sm. 19112
49. Pileus with pallid veil remnants appressed
over marginal area.....50
50. Stipe 6-9 cm. long, 10-16 mm. thick;
pellicle of narrow subgelatinous
hyphae.....510. C. Sm. 20026

50. Stipe 4-7 cm. long (3) 4-8 (10) mm.
thick; pileus cuticle a layer of
radial hyphae with somewhat enlarged
cells several deep.....487. C. 35045
51. Odor distinctive.....52
51. Odor not distinctive.....53
52. Odor of radish.....511. C. glabrellus
52. Odor penetrating and subaromatic.....512. C. rigens
53. Pileus deep vinaceous brown ("Natal
brown" to "Rood's brown").....513. C. 27844
53. Pileus russet on disc, margin \pm avellaneous;
no cheilocystidia seen.....514. C. Sm. 19115
53. Pileus "argus brown" moist, cinnamon
faded; cheilocystidia 23-30 x
4-7 μ515. C. Hesler 12708
53. Not as in either of above choices.....54
54. Pileus tawny moist fading to
cinnamon buff.....516. C. Sm. 27314
54. Pileus pale umber-cinnamon fading to
pale reddish gray (Kauff.).....517. C. errugatus
54. Pileus chestnut color moist.....518. C. praepallens

Division 5

1. Lamellae ferruginous red to cinnamon brown.....2
1. Lamellae vinaceous to vinaceous umber.....13
2. Stipe at least tinged violaceous to
purple at apex.....3
2. Not as above.....4
3. Stipe with "apricot orange" fibrils from
universal veil over basal portion; gills
hazel when young.....519. C. Sm. 24720
3. Universal veil tileul buff (pallid); gills
dull cinnamon brown.....520. C. Sm. 26891
4. Lamellae ferruginous young.....5
4. Lamellae russet to cinnamon brown young.....7
5. Spores $6.5-7.5 \times 5.2-6.2 \mu$521. C. Sm. 20101
5. Spores longer in relation to width.....6
6. Stipe pallid.....522. C. illuminus
6. Stipe rufous to apricot orange.....
..... 523. C. californicus and var. microsporus
7. Odor and taste distinctive.....8
7. Not as above.....9
8. Odor of fresh green corn..... 524. & 525. C. 19492
8. Odor of radish.....526. & 527. C. uraceus
8. Odor faintly fragrant.....528. C. Sm. 24102
9. Universal veil remnants cinnamon
buff.....436. C. Sm. 27159
9. Universal veil remnants white.....10

10. Spores 7-8 x 6-7 μ , subglobose....529. C. Sm. 34689
10. Spores not as above.....11
11. Pileus natal brown young, fading
to fulvous.....467. C. Sm. 34481
11. Pileus bister young, fading to clay
color more or less.....12
12. Stipe bister in apex young, paler in
age.....528. C. Sm. 24102
12. Stipe near Army brown (vinaceous brown)
in apex at first.....530. C. Sm. 30913
13. Stipe apex violaceous, grayish
violaceous to violaceous brown
(brownish drab) (violet often obscure).....14
13. Not as above.....20
14. Stipe deep purple in apex, Rood's brown
in base.....531. C. Sm. 27505
14. Not as above.....15
15. Stipe with Isabella color fibrils from
veil over basal portion.....532. C. Sm. 24814
15. Not as above.....16
16. Stipe pale lilac within apex, whitish
downward.....533. C. Sm. 24705
16. Stipe brownish or becoming so.....17
17. Odor slightly disagreeable; lamellae sub-
distant to distant.....534. C. Sm. 24910
17. Not as above.....18
18. Stipe equal, violaceous inside and out near
apex, pallid brownish downward....535. C. Sm. 19867

18. Not as above.....19
19. Lamellae "onion skin pink" (pale vinaceous brown); stipe clavate.....536. C. Sm. 27741
19. Lamellae darker ("seal brown") young; stipe equal (see C. 19866 also).....537. C. stemmatus
20. Odor or taste slightly of radish.....21
20. Not as above.....22
21. Universal veil rusty yellow and leaving one or more zones over lower half of stipe.....538. C. distans var. olympianus
21. No universal veil present, stipe streaked longitudinally with "Mars yellow" fibrils.....539. C. Sm. 9272 (angulosus?)
22. Universal veil remnants thin but yellow (see young material).....540. C. Sm. 34482
22. Universal veil remnants if present pallid to white.....23
22. Universal veil remnants "light grayish vinaceous".....541. C. Sm. 31592
23. Pileus typically 4-10 (15) cm. broad.....24
23. Pileus typically 2-5 cm. broad.....26
24. Spores 7-3.5 x 5-6 μ ; pileus furfuraceous when faded.....542. C. cacaocolor
24. Not as above.....25
25. Spores 8-11 x 4.5-5 μ , somewhat boletoid in shape.....419. C. Sm. 26692
25. Spores 8-10 x 5-6 μ , ellipsoid.....543. C. privignus

26. Stipe with pinkish lilac ("light grayish vinaceous") fibrils sheathing the base; gills close; spores 6-7 x 5-5.5 μ541. C. Sm. 31592
26. Not as above.....27
27. Universal veil remnants over lower part of stipe copious or at least distinct.....28
27. Not as above.....29
28. Pileus bister to snuff brown.....544. C. Sm. 20103
28. Pileus "chestnut" (deep red-brown); flesh violaceous umber.....545. C. Sm. 24699
28. Pileus Rood's brown (deep vinaceous); flesh concolor.....547. C. 27516
29. Lamellae crowded.....518. C. praepallens
29. Lamellae distant to subdistant (see 19485 also).....30
30. Color of cap auburn to russet moist.....546. C. Sm. 18358
30. Color of cap purplish umber to vinaceous brown.....31
31. Spores 8-10 x 5-6 μ ; lamellae Verona brown to vinaceous fawn young.....547. C. Sm. 27516
31. Spores 7-8.5 x 5-6 μ ; lamellae Sorghum brown young.....548. C. Sm. 27739

Division 6

1. Young stipe with remains of colored universal veil.....2
1. Universal veil, if present, white (in age the remnants may discolor somewhat).....8
2. Universal veil remnants reddish to vinaceous.....3
2. Universal veil remnants brownish, buff yellow, or violaceous.....6
3. Base of stipe brick red to vermillion; pileus watery cinnamon or rufous tinged....549. C. rubripes
3. Not as above.....4
4. Spores 7-8 x 4-4.5 μ ; lamellae drab as seen along edges but "cinnamon drab" in face view.....441. C. Sm. 27666
4. Spores 8-10 x 5-6 μ ; lamellae "light vinaceous drab" young (more violaceous than in above).....550. C. boulderensis
5. Spores subglobose to broadly ellipsoid 7-8 x 5.5-7 μ551. C. deceptivus
5. Spores narrower in relation to length.....6
6. Spores 6-7.5 x 3.5-4 μ552. C. Sm. 27508
6. Spores 7-10 x 5-6 μ7
7. Pileus purple drab young.....553. C. subpurpureus
7. Pileus bister at first.....554. C. Sm. 24100
8. Stipe typically clavate to bulbous at base.....9
8. Stipe typically equal or nearly so.....27
9. Spores subglobose (7-8 x 5-7 μ).....10

9. Spores narrower in relation to length.....13
10. Pileus watery cinnamon (appearance of
C. distans).....555. C. Hesler 16396
10. Not as above (color various).....11
11. Odor and taste of radish; pileus fawn
color to vinaceous fawn.....556. C. Sm. 16968
11. Not as above.....12
12. Spores 7-8 x 6-7 μ (see C. 27993
also).....557. C. injucundus
12. Spores 6.5-7.5 x 5-5.5 μ567. C. Sm. 27078
13. Universal veil leaving a membranous annulus
or margin of cap appendiculate with membranous
patches of broken veil; odor usually sweet-
aromatic when flesh is crushed (but see
C. impennis also).....558. C. torvus
13. Not as above.....14
14. Odor fragrant (fruity?); stipe 4-8 mm. at
apex; no universal veil present..559. C. boreasensis
14. Not as above.....15
14. Odor pungent (radish like?); universal veil
copious; stipe bright lilac ("lobelia
lilac").....560. C. 27416
14. Not as above.....15
15. Mucronate to saccate cheilocystidia
present; pileus when young purple umber &
streaked; lamellae deep testaceous purple
brown; spores 8-10.5 x 5-6.5 μ561. C. impennis

15. Not as above.....16
16. Lamellae "Hays lilac" (brilliant lilac);
spores 7-8 x 5-6 μ562. C. Sm. 27743
16. Not as above.....17
17. Lamellae lavender; pileus 5-10 cm.
broad.....563. C. lucorum & C. umidicola
17. Not as above.....18
18. Lamellae faintly caesious; pileus 5-10 cm.
broad; universal veil remnants conspicuous
at least along cap margin.....565. C. plumiger
18. Not as above.....19
19. Lamellae purple ("dark livid brown");
pileus reddish umber;.....566. C. Sm. 24759
19. Lamellae merely violaceous to violaceous gray.....20
20. Spores 6.5-7.5 (8) x 5-5.5 μ567. C. Sm. 27078
20. Spores larger 7-10 x 4.5-6 μ21
21. Pileus deep violaceous brown to dark vinaceous
brown ("Natal brown" to "Hays brown").....22
21. Pileus paler vinaceous brown than in above
("pecan brown" to "Walnut brown") or tawny,
russet, or other shades of yellow brown.....25
22. Pileus Natal brown fading to cinnamon
buff; lamellae dull violaceous brown at
first (see 19867 also).....568. C. biformis
22. Fading to paler vinaceous brown or
reviving dark.....23

23. Lamellae "pale purple drab" young;
stipe concolorous with pileus (see
C. scutulatus also with spores 6-7 μ
broad).....569. C. adustus
23. Lamellae "light vinaceous drab".....24
24. Margin of mature moist cap usually
faintly translucent striate.....570. C. Sm. 24851
24. Never striate.....571. C. Sm. 31847
25. Odor faintly fragrant; lamellae
"light quaker drab".....572. C. Sm. 33913
25. Not as above.....26
26. Stipe buffy citrine in base.....573. C. Sm. 27533
26. Not as above.....574. C. brunneus and forms
(575, 576) key out here along with C. 21039
(582) (247) 32774, and C. 27533 (573).
27. Spores subglobose to broadly ellipsoid.....28
27. Spores longer in relation to width.....31
28. Pileus and stipe with violaceous purplish
to lilac tints.....29
28. Pileus and stipe lacking above colors or only
the stipe evanescently violaceous in apex.....30
29. Pileus gills and stipe deep purplish.....C. 27993
29. Pileus with lavender margin; stipe
purplish in apex.....577. C. 31747
30. Cap margin Isabella color to olive
brownish; stipe violaceous within at
apex.....578. C. 35941

30. Pileus and stipe lacking violaceous to purplish tints; pileus russet to cinnamon brown.....579. C. Sm. 19310
31. Odor raphanoid (faint in some).....32
31. Odor not distinctive even when flesh is crushed.....34
32. Stipe pale lavender to deep violet.....428. C. evernius
32. Stipe dull purplish to brownish.....33
33. Spores 8-10 x 5-6 μ580. C. cypriacus
33. Spores 7-8 x 4.5-5 μ581. C. Sm. 25026
34. Spores 3.5-4 μ in diam.....582. C. Sm. 21039
34. Spores 5-6 (7) μ in diam.....35
35. Pileus "mummy brown" fading to "hazel".....583. C. Kauffmanianus
35. Pileus not ferruginous when faded.....36
36. No evidence of a universal veil.....37
36. Universal veil present at first (as zones of fibrils or a sheath on stipe).....38
37. Pileus "dark livid brown"; gills "dark vinaceous brown"; apex of stipe "slate purple", lower down "pale vinaceous lilac".....584. C. Sm. 31745
37. Pileus "chestnut brown" moist; lamellae violaceous with a lavender tinge; stipe faintly violaceous at least above.....585. C. imbutus

37. Pileus watery brown moist; gills tinged violaceous or purplish; stipe violaceous above, whitish below.....586. C. saturninus
38. Spores 8-10 x 6-7 μ587. C. scutulatus
38. Spores narrower.....39
39. Pileus brownish violaceous ("Benzo brown" to "cinnamon drab").....588. C. Sm. 27985
39. Pileus verona brown to more vinaceous.....40
39. Pileus chestnut, russet, or cinnamon brown.....42
40. Lamellae with a trace of lilac at first but soon fawn color.....589. C. Sm. 20837
40. Lamellae "light purple drab"; pileus fading to wood brown or fawn color.....594. C. Sm. 19690
40. Not as in above choices.....41
41. Spores 6-7.5 x 4.5-5.2 μ ; lamellae dark vinaceous drab.....591. C. Sm. 24858
41. Spores 7-9 x 5-6 μ ; lamellae "Hay's brown" young.....590. C. Sm. 18359
42. Spores 6-7.5 x 4.5-5.2 μ591. C. Sm. 24858
42. Spores larger.....43
43. Lamellae dark violaceous brown.....44
43. Lamellae truly violaceous to violet gray and often pale.....45
44. Cap margin translucent striate moist and cinnamon brown fading to pinkish buff.....592. C. Sm. 20102

44. Cap not striate, fading to clay color;
lamellae dark purple umber young.....590. C. 18359
45. Stipe becoming bister from base up
in age.....593. C. Sm. 24905
45. Not as above.....46
46. Lamellae "light purple drab"; pileus
chestnut and fading to wood brown or
fawn color.....594. C. Sm. 19690
46. Lamellae at first "dark plumbago
gray"; pileus fuscous to bone
brown.....595. C. Sm. 26628

Section Graciles

Subsection Macrospori

spores 9-11 μ or more long

1. Lamellae violaceous to violaceous brown,
or vinaceous brown to "Verona brown".....2
1. Lamellae not as above.....7
2. Spores up to 5 μ broad.....3
2. Spores 5-6.5 μ broad.....4
3. Odor strongly acid; lamellae close.....596. C. 34923
3. Odor lacking; lamellae
subdistant.....597. C. Milford 10-4-45
4. Stipe lacking remnants of a universal
veil; pileus gills & stipe concolorous,
(dark violet to violet umber, fading
to deep vinaceous brown)..... 598. C. pulchellus
4. Stipe with a median white annulus...599. C. imitatus
4. Not as above, universal veil present.....5
5. Universal veil remnants yellow to buff
(see 21043 also).....721. C. Sm. 27315
5. Universal veil remnants pallid.....6
6. Stipe becoming mummy-brown to blackish
from base up in age (see 23728 and 27664
also).....600. C. Sm. 35309
6. Lamellae dusky purplish.....601. C. feliciatus
6. Lamellae "fawn color" young; stipe pale
incarnate brown over all in age....435. C. Sm. 27529

6. Lamellae "sorghum brown" young; stipe dark vinaceous brown in age.....431. C. Sm. 24859
6. Lamellae dark plumbago blue.....602. C. near Azureus
7. Spores 12-15 x 6.5-8 μ ; pileus vinaceous brown fading to avellaneous.....603. C. iliopodius
7. Spores 10-13 x 6.5-8 μ ; pileus mummy brown fading to ochraceous buff.....604. C. bistreoides
7. Spores not as above (spores 11-12.5 x 6.5-7.5 in C. badius).....8
8. Universal veil remnants yellow to cinnamon buff.....9
8. Universal veil if present white.....11
9. Pileus dark vinaceous brown fresh.....605. C. Sm. 25020
9. Pileus chestnut, russet to tawny.....10
10. Pileus glabrous to slightly silky from thinly dispersed remnants of universal veil, tawny fading to ochraceous tawny.....606. C. 34643
10. Pileus fibrillose punctate to furfuraceous, chestnut to russet or Mars brown, near tawny faded; odor not distinct.....607. C. Sm. 26709
10. As above, but with odor of mice.....251. C. conicatellus

11. Stipe lacking all evidence of a universal veil....12
11. Stipe decorated with remnants of
universal veil.....13
12. Pileus pinkish buff fresh, whitish
in age..... 608. C. Hesler 14776
12. Pileus tawny fading to clay color and
darkening again on drying.....609. C. Sm. 34030
13. Lamellae yellowish; pileus bay red...610. C. badius
13. Not as above.....14
14. Lamellae "warm sepia" (almost cinnamon
brown) young; universal veil
grayish.....611. C. Sm. 23728
14. Lamellae paler (clay color to
buff), veil white.....15
15. Stipe 6-10 cm. long; spores 10-13 x
5-6.5 μ612. C. Sm. 24694
15. Stipe shorter.....16
16. Spores 10-13 x 5.5-6.5 μ613. C. Sm. 27664
16. Spores 8-10 (11.5) x
5-6 (7) μ614. C. Sm. 19104

Section Graciles
Subsection Microspori

1. Lamellae drab at first.....key a p. 90
1. Lamellae typically yellow young.....key b p. 91
1. Lamellae pallid to cinnamon buff, dull
brown, cinnamon brown, tawny, rufous,
orange, or ferruginous at first.....key c p. 92
1. Lamellae vinaceous, cocoa-color,
violet brown, lilac, violet or
caesious at first.....key d p. 101

Key a

1. Pileus chestnut beneath honey
yellow veil fibrils.....615. C. Sm. 27697
1. Not as above.....2
2. Pileus bister, universal veil
remnants grayish.....616. C. Sm. 24718
2. Pileus benzo brown; veil
pallid.....443. C. fumosifolius

Key b

1. Spores 6-7 x 3.5-5 μ2
1. Spores 7-9 x 5-6 μ3
2. Stipe pallid; universal veil
present.....617. C. castaneoides
2. Stipe brownish downward; universal
veil absent.....618. C. ligniarius
3. Lamellae becoming ferruginous
red.....619. C. Sm. 27662
3. Lamellae not as above.....4
4. Stipe evenly silky fibrillose; pileus
watery-rufous-cinnamon.....620. C. acutus
4. Stipe with remains of universal veil;
pileus ferruginous moist.....621. C. paludosus
4. Pileus "hair brown" to "cinnamon
drab"622. C. nigrelloides

Key c

1. Spores 6-8 μ broad.....2
1. Spores seldom over 6 μ broad.....4
2. Stipe 5-9 (10) cm. long; pileus
fading to yellow.....623. C. gentilis
2. Stipe shorter.....3
3. Lamellae yellowish cinnamon, narrow;
stipe white.....624. C. acutoides
3. Lamellae dull brown, broad; stipe
dark brown.....625. C. 35191
4. Spores 3-4.5 μ broad.....5
4. Spores 4.5-6 μ broad.....11
5. Spores 8-10 x 3.2-3.5 μ , boletoid
in shape.....626. C. Sm. 25014
5. Spores 7-10 x 3.5-5 μ627. C. Sm. 35849
5. Spores 6-8 x 3.5-4.5 μ6
6. Stipe white to pallid when mature;
gills pallid young.....628. C. leucopus
6. Stipe variously colored.....7
7. Pileus translucent striate moist
(see C. 25021 also)629. C. Sm. 21385 (scandens?)
7. Pileus opaque when moist.....8
8. Universal veil absent.....9
8. Universal veil present.....10
9. Stipe Rood's brown (deep vinaceous brown)
beneath coating of silky fibrils...630. C. Sm. 25016
9. Stipe pallid ochraceous.....631. C. Sm. 25021

10. Pileus deep reddish brown ("Carob brown" to chestnut brown"); stipe not darkening appreciably.....632. C. 27667
10. Pileus paler("Verona brown"); stipe darkening.....633. C. Sm. 27163 and Sm. 26797 (634)
11. Odor or taste distinctive (crush the flesh).....12
11. Not as above.....15
12. Pileus striate moist, odor and taste of radish; pileus silky pallid faded.....635. C. acutus
12. Not with above combination of characters.....13
13. Universal veil yellow; odor subnauseous.....615. C. Sm. 27697
13. Not as above.....14
14. Flesh with odor resembling that of Lepiota cristata.....636. C. Sm. 19931
14. Odor of radish (often slight).....637. C. nigrocupidatus
14. "Odor more or less marked".....638. C. rigidus
14. Odor of a green gourd.....639. C. Burke EK
15. Pileus tawny olive to Isabella color but soon ferruginous at least over margin; lamellae cinnamon rufous in buttons; stipe soon stained apricot orange at least near base..... 640. C. miniatopus
15. Not as above.....16
16. Universal veil remnants colored.....17

16. Universal veil remnants white to grayish or absent.....27
17. Universal veil remnants vinaceous to grayish vinaceous.....18
17. Universal veil truly yellow (but see next choice also).....19
17. Universal veil buff to brown.....21
18. Lamellae clay color; pileus vinaceous brown to cocoa-color faded.....642. C. nigrellus var. occidentalis
18. Lamellae cinnamon brown; pileus slowly fading to rusty brown.....643. C. Sm. 30776
19. Stipe slightly violaceous in apex...644. C. gentilissimus var. minutulus (29644)
19. Stipe not violaceous in apex.....20
20. Stipe equal to narrowed below; cheilocystidia present.....645. C. saniosus
20. Stipe clavate to bulbous; no cheilocystidia seen.....646. C. Sm. 27846
21. At least some specimens in a collection with distinct fibrillose squamules over the cap.....22
21. Glabrous to silky, rarely minutely squamulose.....25
22. Spores 8-10 x 5-6 μ647. C. Sm. 31319
22. Spores 7-8 μ long.....23
23. Lamellae russet to cinnamon brown young.....648. C. angelesianus

23. Lamellae paler.....24
24. Lamellae narrow; some basidia violet
revived in KOH; veil remnants nearly
cinnamon brown.....649. C. Sm. 24594
24. Lamellae broad; basidia dull vinaceous
brown revived in KOH; veil remnants
dull (see 24608 also).....650. C. Sm. 31808
651. C. psammocephalus
25. Pileus margin not striate; veil remnants
on stipe merely brownish; stipe 6-10 cm.
long.....652. C. Sm. 24608
25. Pileus margin striate; veil remnants
pale buff.....26
26. Stipe darkening to mummy brown at base;
lamellae dull brown at first.....653. C. Sm. 23471
26. Stipe not darkening; lamellae pale
ochraceous tawny.....654. C. Sm. 24104
27. Stipe violaceous in apex at least.....28
27. Stipe not as above.....32
28. Lamellae "bay" (red) with tawny edges,
becoming hazel; stipe vinaceous brown below,
dark indian red in apex in age.....655. C. colus
28. Not as above.....29
29. Pileus umbo umber to blackish, margin
not translucent striate; lamellae
pallid to pale brownish at
first.....656. C. erythrurus

29. Not as above.....30
30. Spores 6-7 x 5-5.5 μ657. C. Sm. 24864
30. Spores 7-10 x 4.5-5 μ31
31. Pileus pale tawny cinnamon moist;
stipe 3.5-5.5 mm. thick.....658. C. Sm. 19393
31. Pileus Mars brown to russet; stipe
2.5-3 mm.....659. C. Sm. 31053
32. Evidence of universal veil present on
lower part of stipe.....33
32. Not as above.....53
33. Stipe darkening from base upward.....34
33. Stipe not darkening (some dark over all
from first).....43
34. Spores 6-8.5 x 4-6 μ35
34. Spores 7.5-10 x 5-6 μ37
35. Lamellae brownish gray to subochraceous;
pileus watery cinnamon moist....660. C. hemitrichus
35. Lamellae \pm "cinnamon brown" young.....36
36. Stipe with a median membranous annulus;
spores 5-6 μ in diam.....662. C. 35905
36. Stipe merely with a median fibrillose
zone; spores 4.5-5 μ661. C. 24167
37. Pileus mummy brown to blister, margin
finally striatulate.....663. C. Sm. 27353
37. Not as above.....38
38. Pileus army brown (vinaceous) fading to
wood brown.....637. C. nigrospidatus

38. Not as above.....39
39. Stipe 2-4 cm. x 1-3 mm.....40
39. Stipe 5-10 cm. x 2-6 mm.....41
40. Lamellae pallid young.....664. C. impolitus
40. Lamellae pale cinnamon brown
young.....665. C. Sm. 27598
41. Pileus fuscous to bister young;
universal veil copious.....666. C. palaceus
41. Pileus Warm sepia to cinnamon rufous.....42
42. Lamellae "Saccardo's umber"
young.....667. C. Sm. 20517
42. Lamellae cinnamon then
ferruginous.....668. C. incisus
43. Pileus color in dark vinaceous brown
series when moist (bone brown, Rood's
brown, etc.).....44
43. Pileus in russet to cinnamon brown
series moist.....47
44. Stipe pale ochraceous tawny.....45
44. Stipe concolorous with pileus.....46
45. Pileus translucent striate on margin;
lamellae broad and subdistant;
subalpine.....669. C. Sm. 27158
45. Pileus opaque on margin; lamellae close
and only moderately broad; growing under
brush in southern Michigan.....670. C. Sm. 18821

46. Lamellae "bister" to "Hays brown"
young (dark brown with a testaceous
cast).....671. C. glandicolor var. curtus
46. Lamellae merely cinnamon brown to
ochraceous tawny.....638. C. rigidus
47. Cheilocystidia present; caespitose; stipe
with copious veil remnants.....672. C. Sm. 30362
47. Not as above.....48
48. Pileus when faded fibrillose-furfuraceous
(see C. 19103 also).....652. C. Sm. 24608
48. Not as above.....49
49. Stipe 5-10 cm. long; pileus ±
chestnut brown.....673. C. gracilis
49. Stipe shorter.....50
50. Stipe ± cinnamon brown throughout interior.....51
50. Stipe ± ochraceous tawny inside.....52
51. Lamellae cinnamon brown young.....674. C. 19103
51. Lamellae ochraceous tawny young.....674a. C. 31689
52. Pileus ± ochraceous tawny moist;
lamellae subdistant.....675. C. 23733
52. Pileus ± russet; lamellae
close.....670. C. Sm. 18821
53. Stipe darkening at least over
base in age.....54
53. Stipe not as above, if dark colored
then dark throughout.....60

54. Pileus deep red-brown ("Carob brown" to "Chestnut"); pith of stipe Carob brown, cortex pale yellow.....676. C. Sm. 27698
54. Not as above.....55
55. Pileus margin translucent striatulate moist.....56
55. Pileus margin opaque at maturity.....57
56. Spores 8-10 x 5-6 μ677. C. fuscodiscus
678. C. Singer F 348
56. Spores 7-8.5 x 4.5-5.2 μ679. C. Sm. 19857
57. Pileus pale alutaceous fading to buff-yellow.....680. C. pallidus
57. Pileus darker when moist.....58
58. Cheilocystidia 15-20 x 7-10 μ681. C. juberinus
58. Cheilocystidia not differentiated.....59
59. Spores 7.5-10 x 3.5-5 μ , narrowly inequilateral in side view.....627. C. 35849
59. Spores 7-9 x 5-5.5 μ , ellipsoid...682. C. Sm. 24949
60. Pileus color in vinaceous brown series or red brown, (Rood's brown etc.).....61
60. Pileus color in yellow brown series.....64
61. Spores 8-10 (11) x 5-6 μ ; pileus carob brown with a brick red tinge.....683. C. Sm. 27847
61. Not as above.....62
62. Stipe cinnamon buff to pinkish buff below.....684. C. Sm. 27697
62. Stipe at least pale vinaceous.....63
63. Lamellae pallid at first,.....685. C. germanus

63. Lamellae ochraceous tawny
at first.....686. C. decipiens
64. Stipe pallid to whitish in mature caps.....65
64. Stipe \pm concolorous with pileus.....66
65. Cheilocystidia 18-38 x 9-12 μ ,
clavate.....687. C. obtusus
65. No cheilocystidia seen.....688. C. scandens
66. Pileus translucent striate in moist
mature caps.....67
66. Not as above.....70
67. Typically caespitose.....689. C. fasciatus
67. Typically scattered-gregarious.....68
68. Stipe 3-6 mm. thick.....690. C. Sm. 21462
68. Stipe 1-3 mm. thick.....69
69. Stipe 6-10 cm. long, pale cinnamon
brown within.....679. C. Sm. 19857
69. Stipe 2-3 (4) cm. long,
 \pm ochraceous.....691. C. Sm. 31748 and 27517 (692)
70. Stipe "Prout's brown" throughout
(dark cinnamon brown).....693. C. subobtusius
70. Stipe \pm tawny or paler.....694. C. pulcher

Key d

Gills vinaceous to violaceous

1. Spores 6-7 x 4-4.3 μ 695. C. subflexipes
696. C. Sm. 18906
1. Spores larger.....2
2. Stipe lilac to violaceous or purplish
at least in apex.....3
2. Stipe not as above or at most silvery with
a violaceous reflection.....21
3. Lamellae truly violet or lilaceous.....4
3. Lamellae vinaceous brown to "benzo brown"
(violaceous brown).....11
4. No evidence of a universal veil on stipe.....5
4. Universal veil present.....7
5. Pileus gills and stipe dark violaceous
to violet umber ("seal brown") "see
C. pulchellus also).....697. C. fuscoviolaceous
5. Not as above.....6
6. Pileus 2-5 cm. broad; stipe 4-6 mm.
thick.....698. C. castaneus
6. Pileus 10-20 mm. broad; stipe 2-3
mm.699. C. Sm. 27695
7. Universal veil Isabella color....700. C. helveloides
7. Universal veil remnants vinaceous buff
to avellaneous.....8
7. Universal veil pallid to white.....9
8. Spores 7-8 x 4.5-5 μ (see 27911
also).....701. C. Sm. 24617

8. Spores 8-10 x 5-5.5 μ702. C. Sm. 27077
9. Pileus gills and stipe violaceous
when young.....703. C. bibulus
9. Fruiting body not unicolorous.....10
10. Lamellae subdistant, bister with
violet tinge or "dark purple drab",
broad - spores 7-8 x 4-5 μ704. C. Sm. 18782
10. As above but spores 8-10 x
5-6 μ705. C. near Cookii
10. Lamellae "heliotrope slate" young
(dark violet) close to subdistant,
narrow.....706. C. Sm. 28593
11. Stipe livid purple, darkening in base, with
a thin layer of wine red fibrils (or these
scattered) over base.....707. C. paragaudiois
11. Not as above.....12
12. No evidence on stipe of a universal veil.....13
12. Universal veil present.....14
13. Fruiting body unicolorous and deep
brownish violaceous.....697. C. fuscoviolaceus
13. Stipe grayish from appressed
fibrils.....708. C. Sm. 27663 and C. 27911 (709)
14. Universal veil remnants colored or
soon discoloring.....15
14. Universal veil remnants grayish to white.....18
15. Universal veil remnants yellow to orange.....16
15. Universal veil remnants vinaceous buff
to brownish.....17

16. Pileus with yellow squamules on a darker
yellow-brown ground color (moist); stipe
obscurely violaceous at apex....700. C. helveloides
16. Pileus merely with scattered appressed
orange to yellow fibrils on a chestnut
brown ground color; stipe bright
lavender to purple above.....710. C. Sm. 27689
16. Universal veil grayish at first but
becoming yellowish in age; apex of stipe
obscurely violaceous; pileus deep
vinaceous brown.....711. C. 4783
17. Veil remnants on stipe pallid but
soon discoloring to brownish or
subfuscous.....712. C. periscelis
17. Veil "vinaceous buff"; stipe "vinaceous
drab" above, base pallid to brownish
(see 27694 also).....713. C. Sm. 27522
18. Pileus cinnamon brown and usually decorated
with small white squamules.....714. C. flexipes
18. Pileus deep vinaceous brown at first:.....19
19. Pileus finally ochraceous tawny and
then margin striatulate, fading to warm
buff or cinnamon buff.....715. C. Sm. 27351
19. Not as above.....20
20. Pileus purplish gray faded; odor slightly
pungent.....716. C. Sm. 27694

20. Pileus Verona brown faded; odor
none.....717. C. Sm. 19943
21. Stipe darkening in base or over all in age.....22
21. Stipe typically unchanging.....27
22. Lamellae violaceous young.....23
22. Not as above.....24
23. Stipe 5-10 cm. long, 4-6 mm. thick
(see 24905, #445 also).....718. C. Sm. 27503
23. Stipe 1.5-2 cm. long, 2-2.5 mm.
thick.....719. C. Sm. 27513
(+Healey No. 19338)
24. Lamellae pecan brown; universal
veil present.....720. C. 24925
24. Not as above.....25
25. Stipe vinaceous buff near apex, base
army brown.....547. C. Sm. 27516
25. Not as above.....26
26. Stipe very dark brown over all
beneath the universal veil
remnants.....671. C. glandicolor var. Curtus
721. C. Sm. 27315
26. Stipe paler, universal veil absent.....
..722. C. subacutus C. 24925, and C. Sm. 27515 (729)
27. Universal veil remnants present.....28
27. Universal veil absent.....29
28. Lamellae dull lavender young but
soon fading.....723. C. mucicola
724. C. Sm. 27843

28. Lamellae benzo brown to Verona
brown.....725. see C. Sm. 27317 and 24607 (726)
28. Lamellae liver brown and
scarcely changing.....696. C. Sm. 18906
29. Stipe white; spores 9-10 x
5-6 μ727. C. regularis
29. Stipe brownish at least within.....30
30. Pilei walnut brown to cinnamon brown.....31
30. Pilei violaceous brown.....32
31. Lamellae close; dull dark violet;
pileus opaque.....728. C. Sm. 19873
31. Lamellae subdistant, brownish drab;
pileus striate on margin (see
19485 also).....729. C. Sm. 27515
32. Stipe with obscure violaceous tint
in apex.....730. C. Sm. 27316
32. Stipe concolorous with pileus.....731. C. Sm. 24923