

Key to *Amanita* section *Amanita* for Northeastern North America

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1. Universal veil material powdery to pulverulent/floccose and often left in part as a pulverulent “smear” on upper surface of bulb.
 2. Pileus margin long striate or tuberculate-striate; pileus white to very pale gray to tan to gray-brown; fruiting body rather small and delicate. Possibly a single species?
 3. Pileus white to very pale gray; spores: [not known]
Amanita sp. N23.
 3. Pileus gray to gray brown to tan.
 4. Pileus gray to gray brown; bulb subabrupt or longitudinally compressed; spores [160/8/8] (6.0-) 6.5 - 8.8 (-10.5) × (5.2-) 5.5 - 7.0 (-9.0) μm, (**L** = (6.8-) 7.1 - 8.0 μm; **L'** = 7.4 μm; **W** = 5.8 - 6.4 (-6.5) μm; **W'** = 6.1 μm; **Q** = (1.03-) 1.08 - 1.38 (-1.47); **Q**' = 1.15 - 1.27 (-1.31); **Q'** = 1.22).....
Amanita farinosa.
 4. Pileus tan; bulb subglobose; spores [not known].
Amanita sp. O3.
 2. Pileus margin striate, but neither long striate nor tuberculate-striate; pileus a shade of yellow or tan or salmon; fruiting body not small and delicate.
 5. Pileus a shade of yellow or tan, universal veil a pale dingy tan; most spores subglobose to broadly ellipsoid; spores [1558/78/68] (5.9-) 7.3 - 10.2 (-14.2) × (4.8-) 6.2 - 8.8 (-14.2) μm, (**L** = (7.5-) 7.9 - 9.6 (-10.4) μm; **L'** = 8.7 μm; **W** = (6.3-) 6.8 - 8.0 (-8.8) μm; **W'** = 7.5 μm; **Q** = (1.0-) 1.05 - 1.34 (-1.71); **Q** = (1.08-) 1.10 - 1.25 (-1.36); **Q'** = 1.17).....
Amanita crenulata.
 5. Pileus a shade of salmon; universal veil yellow; most spores ellipsoid to elongate; spores [140/7/7] (8.7-) 10.0 - 14.7 (-18.0) × (4.9-) 5.2 - 8.8 (-10.8) μm, (**L** = (10.6-) 11.5 - 13.2 μm; **L'** = 12.1 μm; **W** = (5.3-) 6.7 - 8.6 μm; **W'** = 7.0 μm; **Q** = (1.39-) 1.47 - 2.02 (-2.62); **Q** = (1.52-) 1.69 - 1.92; **Q'** = 1.73)
Amanita wellsii.
1. Universal veil material pulverulent or not, left as rings or warts on lower stipe or as a limb or roll of tissue at the top of the bulb or ocreate or cothurnate, not left as a “smear” on upper surface of bulb.
 6. Universal veil material on pileus with a middle pulverulent layer that is pinkish to red-brown or darker (e.g., deep brick red), with a layer of pyramidal warts sometimes found above the pulverulent layer, with a thin membranous layer sometimes found below the pulverulent layer; spores [20/1/1] (8.2-) 8.8 - 11.0 × 6.0 - 8.0 (-8.8) μm, (**L** = 9.7 μm; **W** = 7.0 μm; **Q** = 1.15 - 1.66 (-1.69); **Q** = 1.39)
Amanita roseitincta
=*Amanita komarekensis*.
 6. Universal veil material white, cream, tan, red, orange, or yellow, and never structured in three layers.
 7. Universal veil material bright yellow in fresh material.
 8. Exannulate from the “button” stage onward; pileus red; pileus margin long striate; stipe yellow and pulverulent; spores [87/5/4] (8.4-) 9.1 - 11.5 (-12.6) × (5.6-) 6.3 - 7.9 (-8.0) μm, (**L** = 9.9 - 10.9 μm; **L'** = 10.4 μm; **W** = 6.7 - 7.3 μm; **W'** = 7.0 μm; **Q** = (1.26-) 1.31 - 1.64 (-1.67); **Q** = 1.38 - 1.55; **Q'** = 1.48)
Amanita parcovolvata.

8. Annulus present.

- 9. Pileus yellow-orange; pileus marginal striae not long; spores [199/10/6] (7.5-) 8.5 - 10.5 (-12.5) × (7.5-) 7.8 - 9.8 (-11.3) μm, (L = (8.5-) 9.0 - 9.6 μm; L' = 9.2 μm; W = (8.1-) 8.5 - 9.2 μm; W' = 8.7 μm; Q = 1.0 - 1.12 (-1.17); Q = (1.04-) 1.05 - 1.08; Q' = 1.06).....
Amanita frostiana var. *frostiana*
 =*Amanita macrospora*.

- 9. Pileus deep red at first, but rapidly fading to dull brownish orange in sunlight; universal veil always yellow at first (last places to change: under edge of partial veil, on top of bulb); spores [1017/51/40] (7.5-) 9.0 - 12.8 (-19.0) × (5.5-) 6.5 - 8.5 (-11.5) μm, (L = (8.9-) 9.4 - 12.1 (-14.6) μm; L' = 10.8 μm; W = (6.6-) 6.9 - 8.2 (-8.4) μm; W' = 7.6 μm; Q = (1.11-) 1.26 - 1.67 (-2.23); Q = (1.29-) 1.31 - 1.65 (-1.95); Q' = 1.42).....
Amanita muscaria var. *flavivolvata*.

7. Universal veil material not bright yellow in fresh material.

- 10. Pileus orange to red or a combination of these colors over the disc with yellow toward the margin; universal veil on upper bulb and lower stipe often in broken rings with one exception.

11. Pileus brilliant red at first.

- 12. Pileus deep red, not rapidly fading to dull brownish orange in sunlight; universal veil material white or yellow; spores [455/22/18] (7.4-) 8.5 - 11.5 (-13.1) × (5.6-) 6.5 - 8.5 (-9.8) μm, (L = (8.7-) 9.1 - 11.2 (-11.4) μm; L' = 10.0 μm; W = (6.5-) 6.9 - 8.1 (-8.2) μm; W' = 7.5 μm; Q = (1.10-) 1.21 - 1.47 (-1.75); Q = 1.26 - 1.41 (-1.42); Q' = 1.34).....
Amanita muscaria var. *muscaria*.
 [Not confirmed for North America south of Alaska in my experience.]

- 12. Pileus deep red at first, but rapidly fading to dull brownish orange in sunlight; universal veil always yellow at first (last places to change: under edge of partial veil, on top of bulb); spores [1017/51/40] (7.5-) 9.0 - 12.8 (-19.0) × (5.5-) 6.5 - 8.5 (-11.5) μm, (L = (8.9-) 9.4 - 12.1 (-14.6) μm; L' = 10.8 μm; W = (6.6-) 6.9 - 8.2 (-8.4) μm; W' = 7.6 μm; Q = (1.11-) 1.26 - 1.67 (-2.23); Q = (1.29-) 1.31 - 1.65 (-1.95); Q' = 1.42).
Amanita muscaria var. *flavivolvata*.

- 11. Pileus yellow to (occasionally) orange, with disc often more saturated (yellow to orange to red-orange). Universal veil material cream to tan; spores [120/6/6] (7.0-) 8.7 - 12.2 (-14.8) × (5.9-) 6.5 - 8.2 (-9.5) μm, (L = 9.2 - 11.4 μm; L' = 10.5 μm; W = 7.1 - 7.8 μm; W' = 7.5 μm; Q = (1.09-) 1.27 - 1.56 (-1.70); Q = 1.30 - 1.49; Q' = 1.42)
Amanita muscaria var. *guessowii*
 =*Amanita muscaria* var. *formosa* sensu D. T. Jenkins.

10. Pileus not red or orange in any part; universal veil on lower stipe in various forms.

- 13. Pileus entirely white to silvery white; stipe bruising yellowish [Note: There are problems here. Both the characters state prior to this note are also present, at least occasionally, in old specimens of *A. muscaria* var. *guessowii*, especially after rain.]; universal veil material as a series of broken rings on lower stipe; spores [40/2/2] (8.4-) 9.1 - 11.0 (-11.5) × 6.6 - 8.5 (-8.7) μm, (L = 9.3 - 10.5 μm; L' = 9.9 μm; W = 7.2 - 7.8 μm; W' = 7.5 μm; Q = (1.18-) 1.22 - 1.43 (-1.53); Q = 1.31 - 1.35; Q' = 1.33)
Amanita muscaria var. *alba*.

- 13. Pileus usually not pure white, never silvery white; stipe bruising not always known; universal veil material not in a series of rings or broken rings on the stipe base or upper bulb.

14. Pileus whitish with colored disk (yellow to tan to brown, sometimes very pale).

- 15. Most basidia 2-spored; marginal striae rather short; spores 7.5 - 9.0 μm long, subglobose to broadly ellipsoid; little else known
Amanita sp. *R. Shaffer 5457* (MICH).

15. Most basidia 4-spored.

16. Stipe exannulate; pileus white, with disc yellow or tannish yellow or yellowish; volva strongly ocreate; spores [101/5/5] (7.3-) 7.7 - 9.6 (-11.6) × 6.6 - 8.4 (-9.4) μm, (L = 8.1 - 9.0 μm; L' = 8.7 μm; W = 7.1 - 8.1 μm; W' = 7.7 μm; Q = 1.0 - 1.22 (-1.26); Q = 1.10 - 1.16; Q' = 1.13)
Amanita albocreata.

16. Stipe annulate, at least at first; also differing in other characters.

17. Pileus disc yellow to cream to citron-stramineus; universal veil on bulb as small, irregular limb collapsing against stipe.

18. Pileus white to pale yellow, with disc orange-tan to yellow-brown; annulus may be lost in some specimens. Spores (7.0-) 7.7 - 9.1 (-9.4) × (5.6-) 6.3 - 7.7 (-8.4) μm, with Q = 1.14 - 1.20 (-1.27)
Amanita sp. 34.

18. Pileus (other than disc and margin) palely citron-stramineus, with disc saturated cream or stramineus, with margin whitish, 35 - 60 mm. Spores ca. 8 - 10 μm diam., (?)globose.

Amanita stranella

[Also, see *Amanita praecox* nom. prov.]

17. Universal veil cothurnate or ocreate or as a thickened (often rolled) limb; fruiting bodies of diverse sizes.

19. Disk brownish to tannish (may be rather pale to nearly white); margin long striate; fruiting body not large; partial veil funnel-shaped, at least at first; spores [72/4/4] (6.6-) 7.0 - 11.2 (-15.0) × (5.2-) 5.6 - 8.4 (-8.7) μm, (L = 7.8 - 9.8 μm; L' = 8.8 μm; W = 6.3 - 7.1 μm; W' = 6.7 μm; Q = (1.05-) 1.12 - 1.50 (-1.58); Q = 1.22 - 1.39; Q' = 1.31)

Amanita multisquamosa

≡*Amanita pantherina* var. *multisquamosa*

=*Amanita cothurnata.*

19. Otherwise.

20. Fruiting body pallid, slender, small; pileus often viscid/glutinous; spores (7.3-) 7.9 - 10.2 × (5.8-) 6.3 - 7.9 (-8.4) μm; Q = 1.28 [per Jenkins (1986)]; taxon poorly known...
Amanita frostiana var. *pallidipes.*

20. Medium-sized to large fruiting body; pileus disc rather strongly colored yellowish or tannish, never glutinous; partial veil funnel shaped, at least at first; spores 7.9 - 13.2 × 6.3 - 7.9 μm, with Q = 1.43 [per Jenkins (1986)].....

Amanita velatipes

≡*Amanita pantherina* var. *velatipes.*

14. Pileus entirely pigmented (except possibly in narrow region at margin).

21. Pileus usually a bright yellow, with or without brownish tints.

22. Medium to large fruiting body; universal veil in broken rings on stipe base; spores [120/6/6] (7.0-) 8.7 - 12.2 (-14.8) × (5.9-) 6.5 - 8.2 (-9.5) μm, (L = 9.2 - 11.4 μm; L' = 10.5 μm; W = 7.1 - 7.8 μm; W' = 7.5 μm; Q = (1.09-) 1.27 - 1.56 (-1.70); Q = 1.30 - 1.49; Q' = 1.42).

Amanita muscaria var. *guessowii*

=*Amanita muscaria* var. *formosa* sensu D. T. Jenkins.

22. Small to medium-sized fruiting body; universal veil limbate or cothurnate; Q < 1.20.

23. Universal veil on stipe base limbate predominantly limbate. [Possibly a single species.]

24. Pileus deep yellow with brownish tints at least at first; universal veil submembranous; volva limbate; spores [40/2/1] (7.5-) 8.0 - 10.2 (-11.5) × (7.0-) 7.2 - 9.8 (-10.2) μm, (**L** = 8.5 - 9.6 μm, **L'** = 9.1 μm; **W** = 7.7 - 8.7 μm; **W'** = 8.2 μm; **Q** = 1.0 - 1.18 (-1.46); **Q'** = 1.10)
Amanita sp. N25.
24. Pileus sordid pale yellow to stronger yellow, disk usually darkening with time (often taking on brownish or orange-brownish tint); stipe soon becoming exannulate; universal veil ocreate to limbate on starkly white bulb; spores [286/14/13] (6.3-) 7.3 - 9.8 (-12.6) × (5.6-) 7.0 - 9.1 (-11.9) μm, (**L** = (7.6-) 7.9 - 9.3 μm; **L'** = 8.6 μm; **W** = (7.1-) 7.3 - 8.4 μm; **W'** = 7.9 μm; **Q** = 1.0 - 1.17 (-1.42); **Q** = 1.05 - 1.10 (-1.11); **Q'** = 1.08)
Amanita praecox nom. prov.
 =*Amanita sp. 32.*
23. Fruiting body small; universal veil on stipe base cothurnate; spores [not known]
Amanita sp. W2.
21. Usually less intensely colored (pale yellow, stramineous, citron, sordid pale yellow) or not entirely yellow; stipe exannulate or with partial veil at least at first; universal veil on stipe base limbate or ocreate; spores having **Q** > 1.30. [Note: Possibly, several or all of the following are contaxic.]
25. Pileus pale yellow; stipe annulate; subhymenium ramose to slightly inflated ramose [Salem County, NJ specimen had cellular subhymenial base much broader than subhymenium, with $w_{st-near} = 110 - 115 \mu m$ and $w_{st-far} = 120 - 125 \mu m$ and $w_{cs} = 80 - 85 \mu m$]; spores: 8.7 - 11.0 ≠ 5.5 - 8.5 μm, with **Q** = 1.39 [*per* Jenkins (1986)]
Amanita russuloides.
25. Pileus uniformly colored or not; stipe with ephemeral annulus or exannulate from the outset; subhymenium dominated by inflated cells or with structure not yet known; spores with **Q** in the range 1.42 - 1.60.
26. Pileus yellowish with darker disc; lamella trama collapsed in material at hand; spores: [40/2/2] (8.8-) 9.5 - 11.5 (-13.2) × (6.0-) 6.5 - 7.8 (-8.0) μm; **L** = 10.4 - 10.7 μm; **L'** = 10.6 μm; **W** = 6.8 - 7.2 μm; **W'** = 7.0 μm; **Q** = (1.31-) 1.38 - 1.72 (-1.83); **Q** = 1.48 - 1.53; **Q'** = 1.50)
Amanita sp. N19.
26. Subhymenium dominated by inflated elements.
27. Entire pileus very pale yellowish cream, with margin tuberculate striate (up to 0.35R); partial veil ephemeral, sometimes found in shreds on pileus margin; $w_{st-near} = 10 - 20 \mu m$; $w_{st-far} = 25 - 30 \mu m$; spores: [100/5/5] (8.4-) 8.7 - 11.2 (-12.2) × (5.9-) 6.2 - 7.3 (-7.7) μm, (**L** = 9.3 - 10.7 μm; **L'** = 9.9 μm; **W** = 6.5 - 6.8 μm; **W'** = 6.7 μm; **Q** = (1.27-) 1.34 - 1.66 (-2.0); **Q** = 1.42 - 1.60; **Q'** = 1.48)
Amanita sp. S1
 =*Amanita sp. 37.*
27. Pileus pale citron yellow, with margin short striate; $w_{st-near} = 25 - 35 \mu m$ (approximate); $w_{st-far} = 30 - 45 \mu m$ (approximate); w_{cs} unmeasurable in existing material; spores: [40/2/1] (8.4-) 9.1 - 10.5 (-11.2) × (5.6-) 5.9 - 6.6 (-7.3) μm, (**L** = 9.5 - 9.9 μm; **L'** = 9.7 μm; **W** = 6.1 - 6.4 μm; **W'** = 6.2 μm; **Q** = (1.34-) 1.42 - 1.66 (-1.77); **Q** = 1.55 - 1.56; **Q'** = 1.56)
Amanita sp. N8.