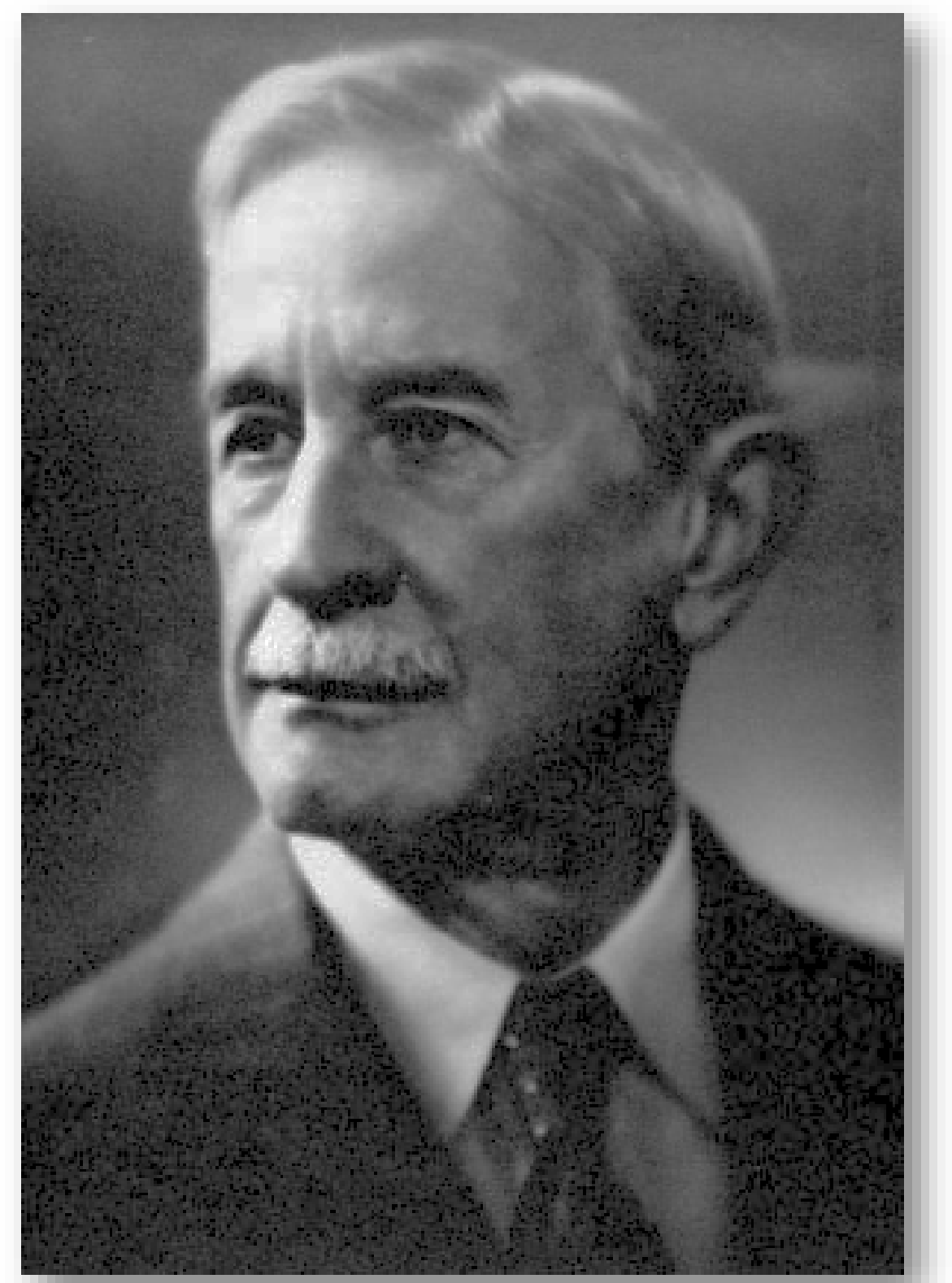


Coker's Amanita taxa: 100 years later

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Dr. William Chambers Coker
24 Oct 1872 – 27 Jun 1953
Photograph source: herbarium.unc.edu

Dr. William Chambers Coker described over 100 new species of fungi during his career at the University of North Carolina at Chapel Hill. Included in Coker's taxa are two species and three varieties in the genus *Amanita* published in *The Amanitas of the Eastern United States* (1917), as well as two additional *Amanita* species published in *New or Noteworthy Basidiomycetes* (1927). All four of Coker's *Amanita* species and one of his three varieties remain accepted. A second variety was elevated to species level, *A. lavendula*. The third remains unresolved. Although two of Coker's *Amanita* species may yet prove to be synonymous with *Amanita elliptosperma* G. F. Atk. described in 1909^[5]. Coker claimed the size, veil attachment, and the flocculent features of *A. hygroscopica* differentiated it from *A. elliptosperma*^[2]. Likewise, Coker believed *A. gwyniana* could be distinguished from *A. elliptosperma* by its size, chlorine like odor, and lack of an apical veil^[2].

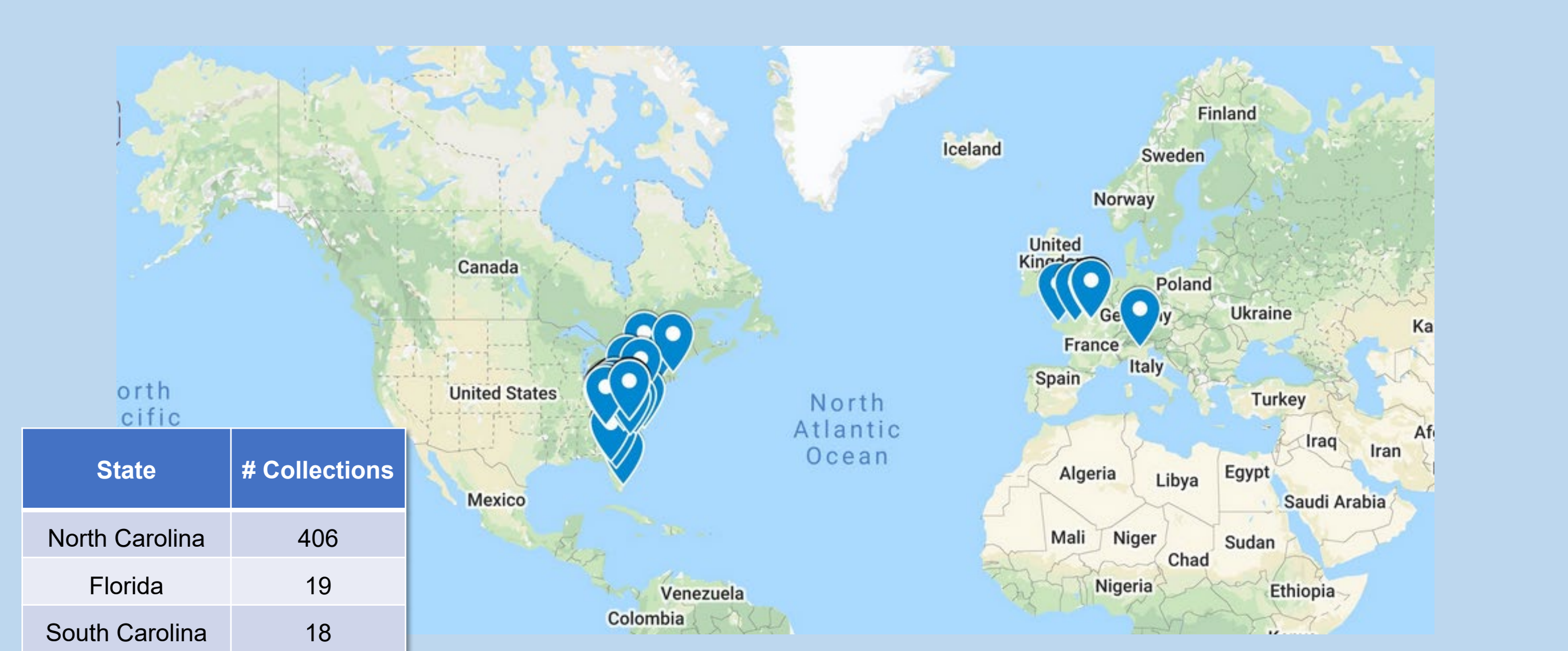
Molecular analysis of *Amanita lavendula* and other lavender staining *Amanita spp.* demonstrated that they form a monophyletic group.

The University of University of North Carolina at Chapel Hill Herbarium (NCU) boasts a modest *Amanita* collection, comprising 650 collections representing 80 taxa. Of these, 42 are type specimens.

Five Coker Amanita taxa stand; one variety raised to species level; one as yet unresolved

Basionym	Current Taxonomic Status	Current Nomenclature [5],[8]	Current Range ^[8]	Comments [1],[2],[8]
<i>Amanita roanokensis</i>	Species remains accepted	<i>Amanita roanokensis</i> Coker	Southern US Atlantic Coastal plain; the Gulf Coast.	A part of the subgroup <i>Lepidella</i> . Often found in association with <i>Quercus</i> and <i>Pinus</i> . Allegedly smells of "cooking meat" or "carrion," depending upon age.
<i>Amanita gwyniana</i>	Species remains accepted	<i>Amanita gwyniana</i> Coker	North Carolina mountains, at elevations of 1000 m.	Rarely collected. Thought to grow primarily in association with <i>Castanea dentata</i> . R.E. Tulloss suggests synonymy with <i>A. elliptosperma</i> is likely ^[8] .
<i>Amanita spissa</i> var. <i>alba</i>	Unresolved	Nom. Illeg.		<i>A. spissa</i> was deemed synonymous with <i>A. excelsa</i> . The name <i>A. spissa</i> var. <i>alba</i> existed prior to Coker's use of the name.
<i>Amanita rubescens</i> var. <i>alba</i>	Variety remains accepted	<i>Amanita rubescens</i> var. <i>alba</i> Coker	Atlantic coastal plain of the US, from NY to SC; east of the Mississippi river.	An albino variant of the Blusher. R.E. Tulloss suggests that this variety is likely a new species, rather than a variety of <i>A. rubescens</i> or even <i>A. ameriubescens</i> . This variety is currently under investigation.
<i>Amanita mappa</i> var. <i>lavendula</i>	Variety raised to species level in 2015	<i>Amanita lavendula</i> (Coker) Tulloss, K. W. Hughes, Rodrig. Cayc., & Kudzma	From as far north as Ontario, Canada to as far south as Hidalgo Mexico	Most often found growing in association with <i>Quercus</i> and <i>Pinus spp.</i>
<i>Amanita atkinsoniana</i>	Species remains accepted	<i>Amanita atkinsoniana</i> Coker	Southern Quebec to Michoacán Mexico.	A member of the <i>Lepidella</i> subgroup. Grows in association with <i>Quercus</i> and <i>Pinus spp.</i>
<i>Amanita hygroscopica</i>	Species remains accepted	<i>Amanita hygroscopica</i> Coker	North Carolina; if synonymous, it shares a range with <i>A. elliptosperma</i> .	Found growing in association with <i>Quercus spp.</i> Tulloss suggests synonymy with <i>A. elliptosperma</i> is likely ^[8] .

Distribution of NCU Amanita collections



Acknowledgement: We express our appreciation to William Burk, Dan Meyers, and Rod Tulloss for their constructive, valuable reviews of the poster.

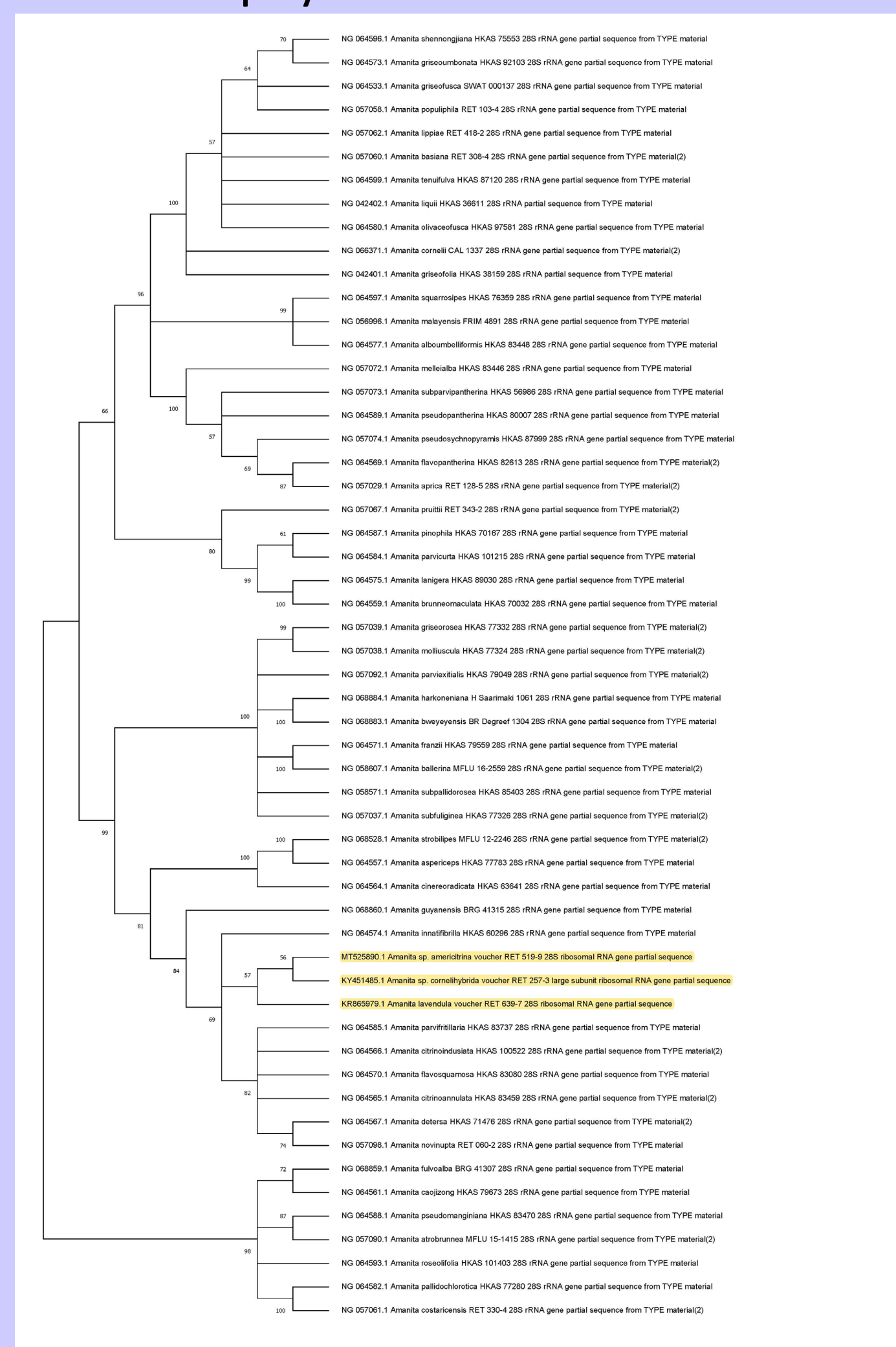
Amanita lavendula and its allies:

The discovery of a novel group of purple staining Amanitas

Amanita mappa var. *lavendula* Coker, raised to the level of species in 2015 as *A. lavendula*, is the subject of ongoing study. Coker's description of this taxon proved important for early examination of the *A. lavendula* group. Subsequent research by Hughes *et. al.* has identified additional lavender staining Amanitas which they have given the provisional names, *A. cornelihybrida* and *A. americitrina*^{[4],[8]}.

The Lavender staining is only known to occur below a temperature of 2°C^[8].

Shown below is a provisional phylogeny for the *Amanita lavendula* group and selected related *Amanita spp.* with similar LSU sequences. Note that the 3 lavender staining *Amanita spp.* form a monophyletic clade.



Methods

Sequences for *Amanita lavendula* group spp. were gathered from [amanitaceae.org](http://www.amanitaceae.org), and used to perform a BLAST search for highly similar and somewhat similar sequences, which were all imported into MEGA X. Evolutionary relationships were inferred by using the Maximum Likelihood method and Tamura-Nei model^[7] with the bootstrap consensus tree inferred from 500 replicates. Branches corresponding to partitions occurring in less than 50% of the bootstrap replicates are collapsed. The percentage of replicate trees in which the associated taxa clustered together are shown next to the branches^[3]. Initial tree(s) for the heuristic search were obtained automatically by applying Neighbor-Join and BioNJ algorithms to a matrix of pairwise distances estimated using the Maximum Composite Likelihood (MCL) approach, and then selecting the topology with superior log likelihood value. This analysis involved 55 nucleotide sequences. There were a total of 1496 positions in the final dataset. Evolutionary analyses were conducted in MEGA X^[6].

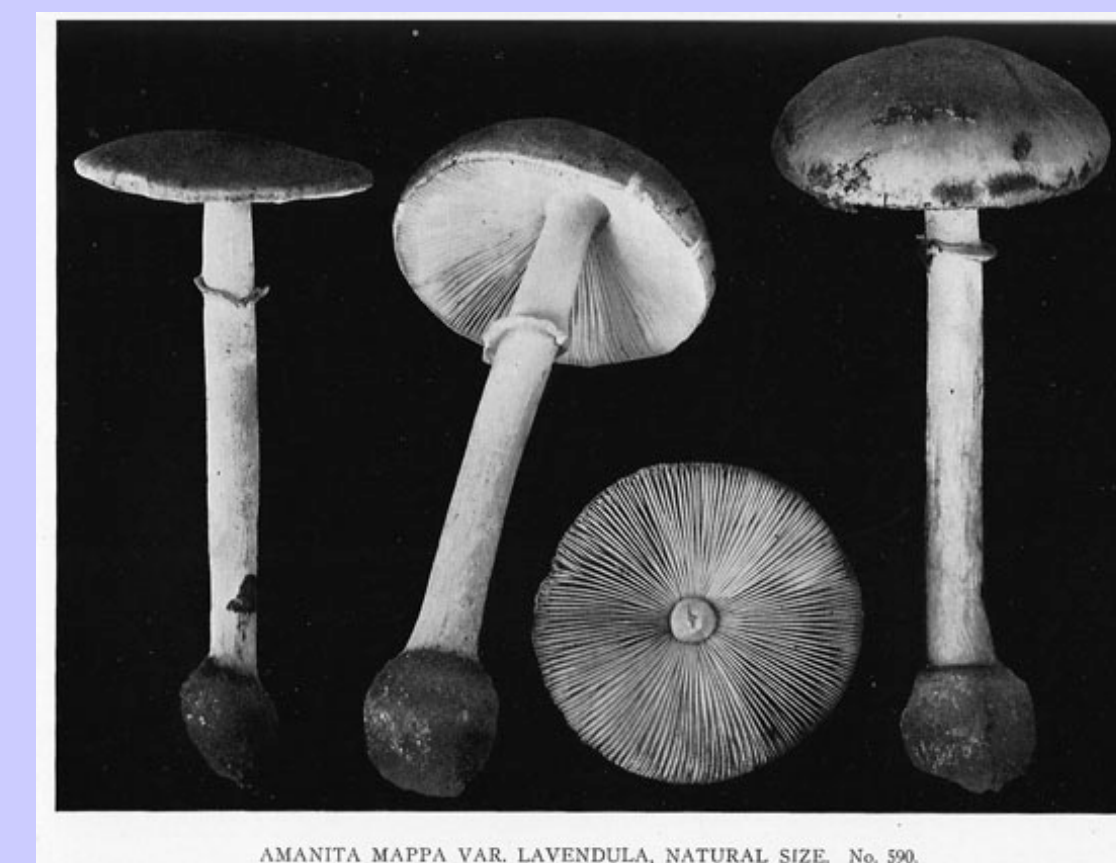


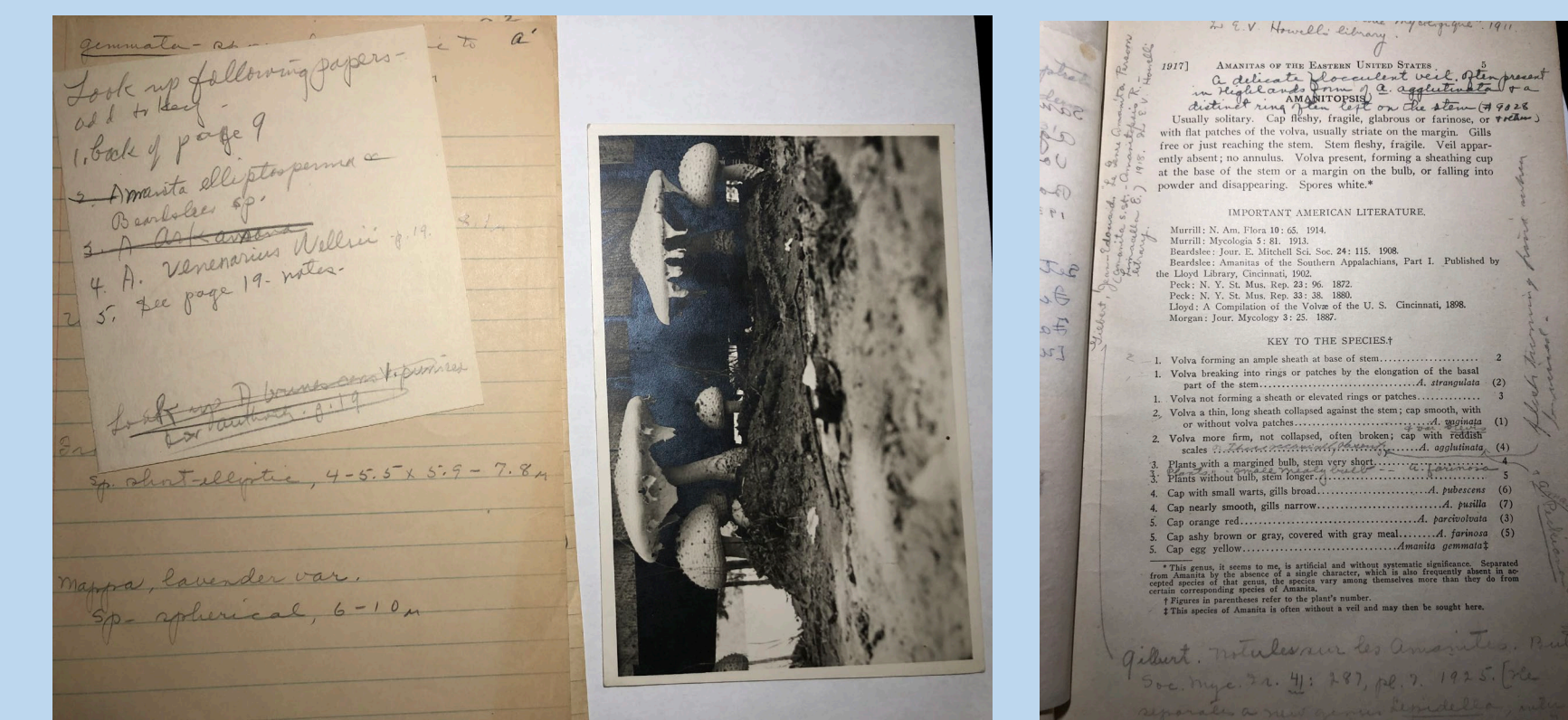
Photo Credits: (top image) Rod E. Tulloss, *Amanita lavendula*, retrieved from <http://www.amanitaceae.org/?Amanita%20lavendula> (bottom image) W.C. Coker in *The Amanitas of the South Eastern United States* (1917)

Additionally, *Amanita americitrina* and *A. cornelihybrida* are shown to likely be more closely related to one another than to *A. lavendula*.

These species and the study thereof demonstrate the importance of Coker's 1917 publication, which was the first to report a lavender staining Amanita. Although taxonomic work is being carried out on *A. lavendula* group, the source of the lavender staining has not yet been identified.

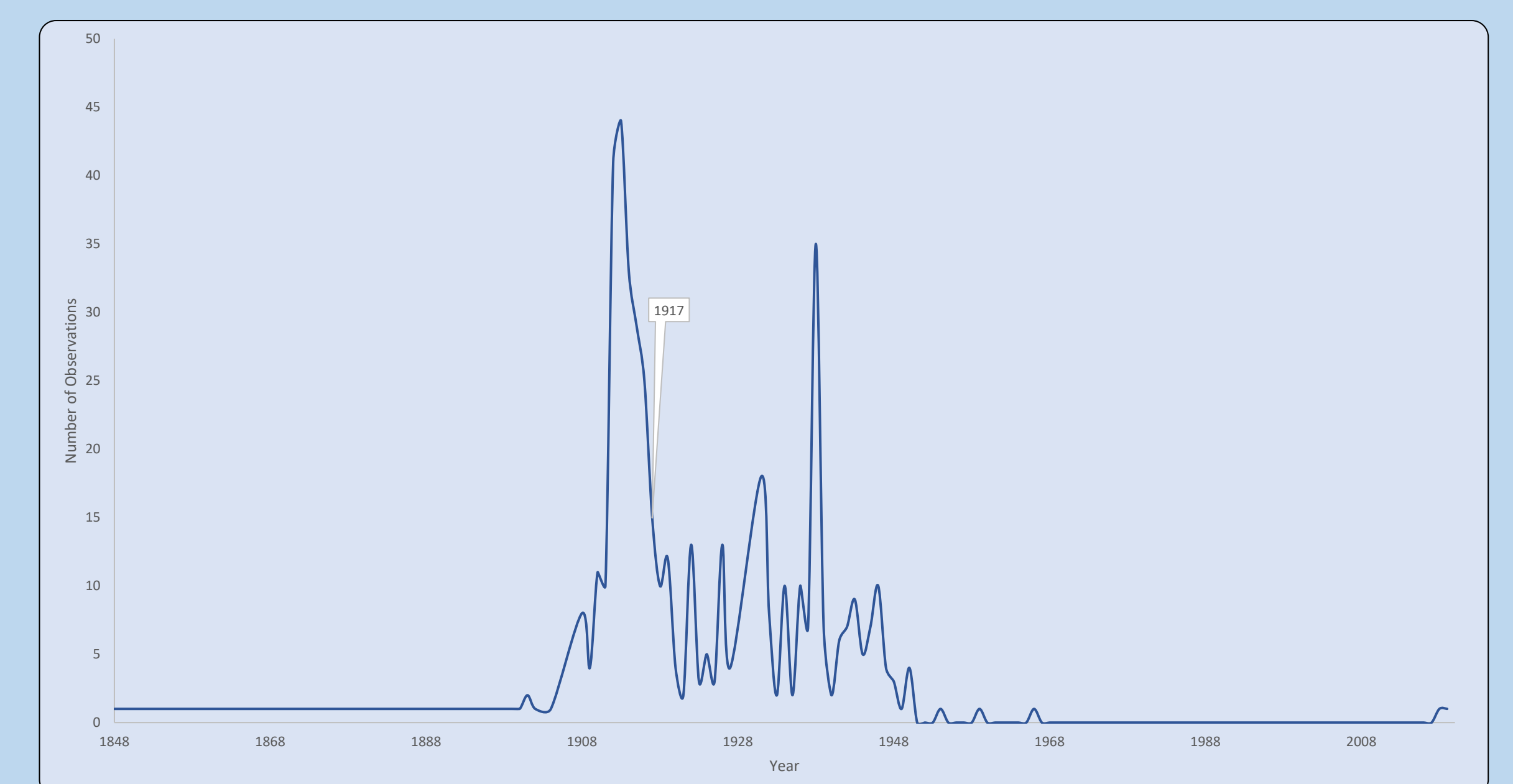
Coker's notes on Amanita rediscovered

In 2020 Coker's working copy of *The Amanitas of the Eastern United States* was rediscovered. This copy includes additional photographs, notes, and updates to both Coker's taxa and other Amanitas present in the eastern United States. The working copy is currently held in the care of the UNC Herbarium (NCU) and will be donated to the UNC Special Collection's Southern Historical Collection for digitization. Several of Coker's species are currently under scrutiny by leading experts on the family *Amanitaceae*. A better understanding of Coker's concept of these species may be immensely important to these studies.



Shown to the left are two images of Coker's working copy. The distinct handwriting of Alma Holland Beers, research assistant and secretary in the UNC Botany department, is visible in both shots. Each page bears similar annotations and the publication is filled with additional photographs and inserted documents.

Timeline of NCU Amanita collections



Distribution of *Amanita* collections accessioned at NCU over time. Note that the highest number of observations occur just before Coker's 1917 publication. Coker's work on the genus *Amanita* is responsible for a substantial portion of the *Amanita* collections held by the NCU Herbarium.

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