= Harrya chromapes =

Harrya chromapes , commonly known as the yellowfoot bolete or the chrome @-@ footed bolete , is species of bolete fungus in the family Boletaceae . The bolete is found in eastern North America , Costa Rica , and eastern Asia , where it grows on the ground , in a mycorrhizal association with deciduous and coniferous trees . Fruit bodies have smooth , rose @-@ pink caps that are initially convex before flattening out . The pores on the cap undersurface are white , aging to a pale pink as the spores mature . The thick stipe has fine pink or reddish dots (scabers) , and is white to pinkish but with a bright yellow base . The mushrooms are edible but are popular with insects , and so they are often infested with maggots .

In its taxonomic history , Harrya chromapes has been shuffled to several different genera , including Boletus , Leccinum , and Tylopilus , and is known in field guides as a member of one of these genera . In 2012 , it was transferred to the newly created genus Harrya when it was established that morphological and molecular evidence demonstrated its distinctness from the genera in which it had formerly been placed .

= = Taxonomy = =

The species was first described scientifically by American mycologist Charles Christopher Frost as Boletus chromapes . Cataloging the bolete fungi of New England , Frost published 22 new bolete species in that 1874 publication . Rolf Singer placed the species in Leccinum in 1947 due to the scabrous dots on the stipe , even though the spore print color was not typical of that genus . In 1968 , Alexander H. Smith and Harry Delbert Thiers thought that Tylopilus was a more appropriate fit as they believed the pinkish @-@ brown spore print ? characteristic of that genus ? to be of greater taxonomic significance . Other genera to which it has been shuffled in its taxonomic history include Ceriomyces by William Alphonso Murrill in 1909 , and Krombholzia by Rolf Singer in 1942 ; Ceriomyces and Krombholzia have since been subsumed into Boletus and Leccinum , respectively . Additional synonyms include Tylopilus cartagoensis , described by Wolfe & Bougher in 1993 , and a later combination based on this name , Leccinum cartagoense .

Molecular analysis of large @-@ subunit ribosomal DNA and translation elongation factor 1? showed that the species belonged to a unique lineage in the family Boletaceae , and the genus Harrya was circumscribed to contain both it (as the type species) and the newly described H. atriceps . Javan species referred to Tylopilus pernanus are sister to the Harrya lineage .

The specific epithet chromapes is Latin for " yellow foot " . It is commonly known as the " yellowfoot bolete " or the " chrome @-@ footed bolete " .

= = Description = =

The fruit bodies have caps that are initially convex before flattening out in maturity , reaching diameters between 3 and 15 cm (1 @.@ 2 and 5 @.@ 9 in) . The cap surface is dry to slightly sticky . It is initially pink to rose @-@ colored , fading to tan or pinkish tan in maturity . The cap margin may curl upward in maturity . The flesh is white , and does not stain blue when it is bruised or injured (an important diagnostic feature of many bolete species) . It does not have any distinct odor or taste . The pore surface is initially white before becoming pinkish to flesh @-@ colored in age . The individual pores are circular to angular , numbering two or three per millimeter , while the tubes are 8 ? 14 mm (0 @.@ 3 ? 0 @.@ 6 in) long . Tubes near the top of the stipe are depressed and almost free from attachment . The stipe measures 4 ? 14 cm (1 @.@ 6 ? 5 @.@ 5 in) long by 1 ? 2 @.@ 5 cm (0 @.@ 4 ? 1 @.@ 0 in) thick and is equal in width throughout its length , or with a slight taper in either direction . The stipe surface has a scurfy texture from scabers that are colored white , pink or reddish . The underlying surface color is white or pinkish except for the yellow base . The mushrooms are edible and good , but popular with insects , and so are often infested with maggots .

The spore print has been reported as ranging in color from pinkish , to pinkish @-@ brown , to rosy

brown , to vinaceous @-@ fawn . The variation in spore print color results in part from differences in moisture content when recorded . Spores are roughly oblong to oval , smooth , hyaline (translucent) to pale brown , and measure 11 ? 17 by 4 ? 5 @.@ 5 µm . They are covered in a gelatinous sheath . The basidia (spore @-@ bearing cells) are club @-@ shaped , two- and four @-@ spored , thin @-@ walled , and measure 25 ? 35 by 10 ? 14 µm . Pleurocystidia (found on the tube walls) are roughly cylindrical to fuse @-@ shaped with rounded tips , and measure 37 ? 50 by 5 ? 8 µm . Cheilocystidia (on the tube edges) are fuse @-@ shaped with a central swelling , thin @-@ walled , and measure 23 ? 40 by 6 ? 8 µm . Caulocystidia at the top of the stipe have various shapes and dimensions of 25 ? 45 by 10 ? 15 µm ; at the stipe base , the caulocystidia are 30 ? 40 by 7 ? 23 µm and are mostly club @-@ shaped to roughly spherical to tear @-@ shaped . The cap cuticle comprises a single layer of tangled hyphae that are 4 ? 6 µm thick .

Several chemical tests can be used to confirm the identify of the mushroom . A drop of ferrous sulfate (FeSO4) on the flesh turns it greenish , while potassium hydroxide (KOH) turns it brown . The cap cuticle turns yellow with nitric acid (HNO3) , and yellow with ammonium hydroxide (NH4OH) .

= = = Similar species = = =

Fruit bodies of Harrya chromapes are readily identified in the field by their rosy color , bright yellow stipe base , and reddish scabers on the stipe . Tylopilus subchromapes is a similar species found in Australia . Tylopilus ballouii has a more orangish cap and lacks the distinctive chrome @-@ yellow stipe base . Harrya atriceps is a closely related rare species from Costa Rica . In contrast to its more common relative , it lacks reddish color in its stipe scabers and has a black cap , although it has a similar yellow stipe base .

= = Habitat and distribution = =

Harrya chromapes is an ectomycorrhizal species , and its fruit bodies grow singly to scattered on soil . They are usually found in forests containing conifers , Betulaceae and oak in North America . The North American distribution includes eastern Canada south to Georgia and Alabama , including Mexico . It extends west to Michigan and Mississippi . The fruit season extends from late spring to late summer . In Costa Rica , where the species associates with oak , it has been recorded from the Cordillera Talamanca , the Poás and Irazu Volcano . It is also in Guatemala . In Asia , it is known from India (West Bengal) , Taiwan , Japan , and in China , where it associates with trees from the beech and pine families .

Fruit bodies can be parasitized by the molds Sepedonium ampullosporum , S. laevigatum , and S. chalcipori . In Sepedonium infections , a white to powdery yellow mold covers the surface of the fruit body . The mushrooms are a food source and rearing habitat for several insect species , including the fungus gnats Mycetophila fisherae and M. signatoides , and flies such as Pegomya winthemi and species of the genera Sciophila and Mydaea . The cottontail rabbit species Sylvilagus brasiliensis has been recorded feeding on the mushrooms in Costa Rica .