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NOTULAE AD FLORAM AGARICINAM NEERLANDICAM – XXXVII
Notes on Agaricus section Arvenses

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Nomenclatural and taxonomical notes are given on species of *Agaricus* section *Arvenses*, together with a key to the accepted species occurring in the Netherlands and adjacent regions. Two new combinations, *Agaricus osecanus* var. *squarrosipes* (Bon & Collin) Nauta and *Agaricus urinascens* var. *excellens* (F. Møller) Nauta are made. A new variety of *Agaricus sylvicola*, var. *squarrosus* Nauta, is described.

In the last few years the species of genus *Agaricus* L. occurring in the Netherlands and adjacent regions have been revised for the Flora agaricina neerlandica. Since the excellent work of Møller (1950, 1952), no revision has been carried out in north western Europe. The present research has revealed that more names exist than species, and a number of taxa have been synonymised. Also, some names which are in use at present have proved to be homonyms or superfluous, and some name changes have become necessary.

In these notes a key to the species and nomenclatural and taxonomical notes are given for section *Arvenses*. Extensive descriptions of the species can be found in the Flora agaricina neerlandica volume 5 (Noordeloos et al., in press).

Agaricus section **Arvenses** Konr. & M., Agaricales I (1949) 104

Surface of pileus yellowish on handling, especially on drying; Schaeffer-reaction on pileus orange, rarely doubtful; stipe annulate; annulus persistent, rarely fragile, with remnants of universal veil as thick flocks or warts on underside; context not discolouring or discolouring slightly yellowish or orange to pinkish in cut basidiocarps; KOH-reaction in context usually positive and yellow; cheilocystidia present, catenate, forming sterile layer around lamella-edge (absent in some taxa not occurring in the Netherlands); spores > 5.5 µm.

KEY TO THE SPECIES OCCURRING IN THE NETHERLANDS AND ADJACENT REGIONS

1. Pileus with yellow to brown scales on paler background; stipe often rooting; cheilocystidia in protuberant clusters and frequently of irregular form; average spore size 8.2–8.8 × 5.5–5.8 µm ..... *A. augustus*
1. Pileus white to yellowish or yellowish brown, if scales present these are mostly concolorous; stipe not rooting; cheilocystidia not in protuberant clusters; average spore size 6.0–10.7 × 4.1–7.2 µm 2
   2. Average spore size 10.1–10.7 × 6.5–7.2 µm; basidiocarps robust; smell soon unpleasant ..... *A. urinascens*
   2. Average spore size < 9.5 × 6.0 µm; basidiocarps gracile to robust; smell usually pleasant, like almonds or anise 3

3. Spores 9.0–9.5 × 5.0–5.5 µm; pileus with appressed coarse scales
A. arvensis var. *macrolepis*

3. Spores < 9.0 µm; pileus without coarse squamules, at most squamulose 4
4. Average spore size 7.7–8.6 × 5.3–5.9 µm 5
5. Robust basidiocarps; pileus > 120 mm; stipe usually floccose-squamulose below annulus, bulbous, 100–200 × 20–30 mm (–45 mm at base); mostly in woods ..... *A. macrocarpus*
5. Basidocarps more gracile; pileus usually < 120 mm; stipe at most fibrillose below annulus, at most subbulbous, 55–120 × 10–20 mm (occasionally up to 34 mm at base); mostly in grassland ..... *A. arvensis*
4. Average spore size 6.0–7.5 × 4.1–5.3 µm 6
6. Basidiocarps gracile, quickly yellowing; annulus usually fragile; average spore size 6.0–6.7 × 4.1–4.7 µm; cheilocystidia globose to clavate
A. sylvicola
6. Basidiocarps gracile or robust, slowly and often faintly yellowing; annulus thick, persistent; average spore size 6.5–7.5 × 4.5–5.3 µm; cheilocystidia globose to clavate, in part utriform 7
7. Stipe cylindrical to rarely subbulbous, (65–)80–120 × 15–28 mm; pileus usually plano-convex, sometimes irregular, at first often minutely fibrillose-floccose, later smooth, 80–175 mm; average spore size 6.8–7.5 × 4.8–5.3 µm; usually in grasslands ..... *A. osecanus*
7. Stipe clavate to bulbous, 50–80 × 8–18 mm, at base 20–26 mm wide; pileus regularly convex, often entirely fibrillose-floccose to squamulose, 65–95 mm; average spore size 6.5–7.2 × 4.5–5.0 µm; in woods
A. pseudoumbrella

NOTES ON THE ACCEPTED TAXA

Agaricus arvensis Schaeff., Fung. Bavariae (1774) 73

Psalliota arvensis (Schaeff.) Kumm., Führ. Pilzk. (1871) 74. — *Psalliota fissurata* F. Møller, Friesia 4 (1952) 165; *Agaricus fissuratus* (F. Møller) F. Møller, Friesia 4 (1952) 204. — *Psalliota leucotricha* F. Møller, Friesia 4 (1952) 159; *Agaricus leucotrichus* (F. Møller) F. Møller, Friesia 4 (1952) 204.

Excluded. Agaricus arvensis sensu Cooke, Ill. Brit. Fungi (1885) pl. 523 (= *Agaricus osecanus*).

KEY TO THE VARIETIES

1. Pileus usually smooth; stipe cylindrical to subclavate, at most fibrillose-squamulose below annulus; spores 7.0–9.0(–9.5) × 5.0–6.0(–6.5) µm ..... var. *arvensis*
1. Pileus with coarse squames; stipe with abrupt bulb, below annulus floccose-squamose; spores 9.0–9.5 × 5.0–5.5 µm ..... var. *macrolepis*

The name *Agaricus arvensis* was not sanctioned by Fries, since he did not accept it as an independent species, but regarded it merely as a synonym of *A. campestris* (Fries, 1821, 1832). The author-citation "Schaeff.: Fr.", often found in literature, is therefore incorrect.

Agaricus fissuratus is considered conspecific with *A. arvensis*. Although forms with an ochraceous, fissurate cap which match the original description of *A. fissuratus* are found in the Netherlands, these are probably ecological modifications, caused by weather or habitat. Likewise, several intermediate forms can be found between *A. leucotrichus,* in its typical form with an entirely fibrillose-squamulose pileus, and *A. arvensis*, with a smooth pileus. It is not unlikely, however, that in the future advanced methods will reveal more taxa within the variable *A. arvensis*.

Agaricus arvensis var. **macrolepis** Pilát & Pouz., Acta Mus. nat. Prag. 7 B-1 (1951) 134 (as *A. macrolepsis*)

Agaricus arvensis subsp. *macrolepis* (Pilát & Pouz.) Bohus, Ann. Hist.-Nat. Mus. Natl. Hung. 81 (1989) 41.

Selected description. Pilát, Acta Mus. nat. Prag. 7 B-1 (1951) 87–90.

Pileus up to 110 mm, white at first, later ochraceous with rusty tinge, covered with appressed coarse squamules. Stipe 70–110 mm, annulate, with abrupt bulb with flattened underside, white, yellowish on handling, below annulus floccose-squamulose. Context discolouring yellow on damaging. Smell like anise. Spores 9–9.5 × 5–5.5 µm (according to Pilát, 1951).

Habitat & distribution — In spruce forests, described from the Czech Republic, probably more widespread. Not yet recorded for the Netherlands.

Agaricus arvensis var. *macrolepis* Pilát & Pouz. differs from var. *arvensis* in the coarsely squamose surface of the pileus, abruptly bulbous stipe, floccose-squamose surface of the stipe below the annulus, and the larger spores. The taxonomical status of this variety needs further consideration.

Agaricus augustus Fr., Epicr. (1838) 212

Psalliota augusta (Fr.) Quél., Champ. Jura Vosges (1872) 255; *Pratella augusta* (Fr.) Gillet, Hyménomycètes (1878) 561. — *Agaricus perrarus* S. Schulz., Verh. zool. bot. Ges. Wien 29 (1880) 493; *Psalliota perrara* (S. Schulz.) Bres., Fungi trident. 1 (1887) 82; *Agaricus augustus* var. *perrarus* (S. Schulz.) Bon & Cappelli, Doc. mycol. 13 (52) (1983) 16. — *Agaricus peronatus* Mass., Brit. fung.-fl. 1 (1892) 415. [non *Psalliota peronata* Richon & Roze, Atl. Champ. comest. vén. (1885) pl. VII, fig. 13–16.]

Misapplied. Agaricus subrufescens Peck sensu J. Lange, Fl. agar. dan. IV (1939) 55.

Agaricus perrarus S. Schulz. is considered a separate species by some authors on account of the more yellow colours of the pileus and the supposedly bigger spores. However, all transitions between the typical *A. augustus* with a brown squamose pileus and the yellow variant have been found, and no difference in spore size could be established. The very pale-coloured form which was provisionally named var. *alba* nom. prov. by Moser (1967) is sometimes found, but seems to be without taxonomical importance.

Small fruit-bodies of *A. augustus* can sometimes superficially resemble large fruit-bodies of *A. arvensis* var. *macrolepis*. Fruit-bodies of the latter taxon are white to ochraceous, have a bulbous stipe instead of a rooting stipe, a stronger odour of anise, and narrower spores. Cheilocystidia of *A. augustus* are usually present in protuberant clusters.

Agaricus osecanus Pilát, Acta Mus. nat. Prag. 7 B-1 (1951) 133

Psalliota nivescens F. Møller, Friesia 4 (1952) 155; *Agaricus nivescens* (F. Møller) F. Møller, Friesia 4 (1952) 204. — *Psalliota nivescens* var. *parkensis* F. Møller, Friesia 4 (1952) 158; *Agaricus nivescens* var. *parkensis* (F. Møller) F. Møller, Friesia 4 (1952) 204.

According to Møller (1952), *A. nivescens* var. *parkensis* (F. Møller) F. Møller differs from the typical variety of *A. nivescens* in the more gracile stipe, smaller pileus, and occurrence in woods. This matches the description of *A. osecanus* Pilát rather well, and the two names are considered synonyms. No clear line could be drawn, however, between a form with smaller fruit-bodies occurring in woods and a form with larger fruit-bodies occurring in grasslands, and these forms are therefore not distinguished as subspecific taxa.

According to Møller (1952) *A. nivescens* and *A. osecanus* differ in spore size: *A. nivescens* 5–6(–7) × 4–4.5(–5) µm, *A. osecanus* 7–7.5 × 5–5.5 µm. The collections studied, however, showed one continuous range of spores between 6.5–8 µm. Original material of Møller's from C of *A. nivescens* revealed larger spores than given by Møller (1952), viz. 6.6–7.5 × 4.9–5.4 µm (pers. comm. M. Brand), almost entirely within the range of those given for *A. osecanus*.

KEY TO THE VARIETIES

1. Stipe below annulus smooth to longitudinally striate, only near base with scattered squames ..... var. *osecanus*
1. Stipe below annulus squarrose ..... var. *squarrosipes*

Agaricus osecanus var. **squarrosipes** (Bon & Collin) Nauta, *comb. nov.*

Basionym: *Agaricus nivescens* var. *squarrosipes* Bon & Collin, Doc. mycol. 17 (67) (1987) 11.
Selected descriptions and figures. Collin, Bull. Soc. mycol. Fr. 109 (1993) pl. 272; Grilli, Micol. Veg. Medit. 9 (1994) 3–8.

Differing from the typical variety in the stipe which is clearly, whitely squarrose below the annulus.

Habitat & distribution — In roadside verges, parks, deciduous woods, on relatively nutrient-rich soil. Very rare in the Netherlands. Also in France and in Italy.

Agaricus pseudoumbrella Bohus, Mikol. Közl. 34 (1995) 26

Agaricus arvensis var. *umbrelloideus* Bohus, Ann. Hist.-Nat. Mus. Natl. Hung. 66 (1974) 82.
Selected description. Bohus, Mikol. Közl. 34 (1995) 26.

Agaricus pseudoumbrella is recognized by the regular convex, slowly yellowing pileus, and the conspicuously bulbous stipe. It is very rare in the Netherlands and only found in the southern part. It can be mistaken for *A. sylvicola* from which it differs in the hardly yellowing pileus and slightly bigger spores and *A. osecanus* from which it differs in the bulbous stipe and the usually fibrillose-squamulose pileus surface. It is rare but widespread in eastern Europe.

Agaricus sylvicola (Vittad.) Peck, Ann. Rep. State Bot. 23 (1872) 97 (as *silvicola*)

Agaricus campestris var. *sylvicola* Vittad., Descr. fung. mang. (1832) 213; *Psalliota sylvicola* (Vitt.) Richon & Roze, Atl. Champ. comest. vén. (1885) pl. VII, fig. 13–16. — *Pratella flavescens* Gillet, Hyménomycètes (1878) 564; *Agaricus flavescens* (Gillet) Britz., Ber. naturh. Ver. Augsburg 27 (1883) 168. — *Agaricus essettei* M. Bon, Doc. mycol. 13 (49) (1983) 56 [nom. nov. for *Agaricus abruptibulbus* Peck sensu auct. eur.].

Misapplied. Agaricus abruptibulbus Peck sensu auct. eur.

Agaricus essettei is often regarded as a separate species, differing from *A. sylvicola* in the stipe with a more abrupt, marginate bulb and slightly larger spores. Since all intermediate forms could be found *A. essettei* is considered conspecific with *A. sylvicola*.

KEY TO THE VARIETIES

1. Stipe below annulus fibrillose, towards base sometimes minutely squamulose var. *sylvicola*
1. Stipe below annulus strikingly squarrose ..... var. *squarrosus*

Agaricus sylvicola var. **squarrosus** Nauta, *var. nov.*

A varitate typica stipite distincte squarroso infra annulum differt.

Holotypus: The Netherlands, Noordoostpolder, Kuinderbos, 1 Sept. 1980, *A.M. Brand 8434* (L 989.085-375).

Differing from the typical variety in the stipe which is distinctly squarrose below the annulus.

Habitat & distribution — In deciduous and coniferous woods on rich soil. Very rare in the Netherlands (Bloemendaal; Kuinderbos, Noordoostpolder; estate Oosterhout, Nijmegen), but probably more widespread. Not yet known outside the Netherlands.

Agaricus macrocarpus (F. Møller) F. Møller, Friesia 4 (1952) 204

Psalliota macrocarpa F. Møller, Friesia 4 (1952) 153.

Because of the very big, robust fruit-bodies, *Agaricus macrocarpus* can sometimes be mistaken for *A. urinascens*. It is distinguished from this species by its smaller spores, and the more bulbous, less squamulose stipe. *Agaricus macrocarpus* is distinguished from *A. sylvicola* by its more robust fruitbodies and larger spores, from *A. arvensis* by its larger, more robust fruit-bodies and bulbous stipe.

Agaricus urinascens (Schaeff. & F. Møller) Sing., Lilloa 22 ('1949' 1951) 431

Psalliota urinascens Schaeff. & F. Møller, Ann. mycol. 36 (1938) 79. — *Psalliota arvensis* subsp. *macrospora* Schaeff. & F. Møller, Ann. mycol. 36 (1938) 78; *Agaricus macrosporus* (Schaeff. & F. Møller) Pilát, Acta Mus. nat. Prag. 7 B-1 (1951) 78 [nom. illeg., later homonym of *Agaricus macrosporus* Mont., Annls Sci. nat., Bot. 8 (1837) 370 = *Lentinus*]; *Psalliota macrospora* (F. Møller & Schaeff.) F. Møller, Friesia 4 (1952) 181; *Agaricus albertii* M. Bon, Doc. mycol. 18 (72) (1988) 63 [nom. nov. for *Agaricus macrosporus* (Schaeff. & F. Møller) Pilát]. — *Psalliota straminea* Schaeff. & F. Møller, Ann. mycol. 36 (1938) 78 (as *Psalliota staminea*); *Agaricus stramineus* (Schaeff. & F. Møller) Sing., Lilloa 22 (1951) 432 [nom. illeg., later homonym of *Agaricus stramineus* Scop., F. carn., ed. 2 (1772) 418 (= *Amanita*

phalloides)]; *Agaricus substramineus* Courtec., Doc. mycol. 16 (61) (1985) 49 [nom. nov. for *Agaricus stramineus* (Schaeff. & F. Møller) Sing.]; *Agaricus stramineosquamulosus* Rauschert, Nova Hedwigia 54 (1992) 215 [nom. nov. for *Agaricus stramineus* (Schaeff. & F. Møller) Sing.; superfluous]; *Agaricus macrosporus* var. *stramineus* (Schaeff. & F. Møller) M. Bon, Doc. mycol. 15 (60) (1985) 25. — *Psalliota collina* Velen., Novit. mycol. nov. (1947) 82. — *Agaricus excellens* (F. Møller) F. Møller, Friesia 4 (1952) 204. — *Agaricus kuehnerianus* Heinem., Num. spec. Bull. Soc. linn. Lyon 43 (1974) 183.

KEY TO THE VARIETIES

1. Stipe short, < 100 mm long, surface below annulus floccose-squamose; pileus soon with yellowish tinges; diameter pileus/length of stipe usually > 1; in grasslands
var. *urinascens*
1. Stipe longer, > 100 mm long, surface below annulus smooth and striate, towards base squamose; pileus whitish; diameter pileus/length of stipe usually < 1; in woods
var. *excellens*

var. **urinascens**

This species is one of the few within the section Arvenses in which the basidiocarps sometimes show a negative Schaeffer-reaction on the surface of the pileus. The remnants of the general veil on the underside of the annulus in the form of coarse squames, together with other, microscopical, characters, provide sufficient reason to consider this species as belonging to this section.

Although *Psalliota urinascens* was originally regarded and described as a species separate from *P. macrosporus* on account of broader lamellae, disagreeable smell and a negative Schaeffer-reaction (Schaeffer & Møller, 1938), Møller himself later came to the conclusion that the name should be considered a synonym (Møller, 1952).

Agaricus substramineus is only a colour variant of *A. urinascens* without taxonomical meaning. Transitions between the darker variant with straw-coloured squames on the pileus and the white variant with concolorous squames or without squames are numerous.

Agaricus macrosporoides Bohus (1974) is a species which macroscopically resembles *A. urinascens* in many aspects, but differs in the spore size of 8–9.5 × 5.3–6.0 µm. According to Bohus (1974) it occurs in saline pastures. Although a collection has been found in the Netherlands in a meadow near the sea on the isle of Terschelling (1996, *Jalink & Nauta 7509*) which matches the original description also in microscopical characters, the taxonomical status and place of this species which only differs in spore size is too doubtful to include it as a separate taxon. Further collections are required to come to a more definitive conclusion.

Agaricus urinascens var. **excellens** (F. Møller) Nauta, *comb. & stat. nov.*

Basionym: *Psalliota excellens* F. Møller, Friesia 4 (1952) 178.

Agaricus excellens (F. Møller) F. Møller, Friesia 4 (1952) 204; *Agaricus macrosporus* subsp. *excellens* (F. Møller) Bohus, Ann. Hist.-Nat. Mus. Natl. Hung. 70 (1978) 105; *Agaricus macrosporus* var. *excellens* (F. Møller) Bohus, Ann. Hist.-Nat. Mus. Natl. Hung. 81 (1990) 41; *Agaricus albertii* var. *excellens* (F. Møller) Bohus, Ann. Hist.-Nat. Mus. Nat. Hung. 82 (1990) 51 [superfluous].

Differing from var. *urinascens* in the whiter colour of the pileus, the slender habitat with stipe longer than 100 mm and mostly longer than pileus width, and the surface of the stipe directly below the annulus which is striate or smooth instead of squamose as in var. *urinascens*.

Habitat & distribution — In coniferous and deciduous woods. Very rare in the Netherlands, but probably more widespread. Known from surrounding countries such as Denmark, Germany, and England but rare.

Although this variety is reported for the Netherlands at more localities (Chrispijn, 1995), most of the available collections could not be identified with certainty as belonging to this taxon. Either the material was too young, or a sufficient macroscopical description was lacking.

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