

A NEW AGROCYBE ON WOODCHIPS IN NORTH WESTERN EUROPE

M. M. NAUTA

Nationaal Herbarium Nederland, Universiteit Leiden branch,
P.O. Box 9514, 2300 RA Leiden, The Netherlands

In the scope of a revision of the genus *Agrocybe* for Flora agaricina neerlandica volume 6, a new species was discovered from heaps of woodchips in Rotterdam, the Netherlands. The species, *Agrocybe rivulosa*, spec. nov. is here described and is characterized by the strongly radially rugose cap, a large but thin ring and large spores of $11.5\text{--}12.0 \times 7.0\text{--}8.0 \mu\text{m}$ on average. It belongs to subgen. *Agrocybe* sect. *Agrocybe* on account of the spores with a conspicuous and wide germ pore and the clavate to sphaeropedunculate cystidia. The species has been found on several localities in the (north)west of the Netherlands. Recently, the species has also been found in the eastern part of the Netherlands and in Luxembourg.

Furthermore, a key is provided to the species on woodchips in the Netherlands and adjacent countries.

The genus *Agrocybe* has been revised recently for the project 'Flora agaricina neerlandica' (Nauta, 1987; in prep. a), resulting in 13 species recorded for the Netherlands. Remarkably enough, two new species were found among the material from the Netherlands already present in L. One of them is described here, the other new species, which belongs to sect. *Pediadeae*, is described elsewhere in this volume (Nauta, in prep. b).

In 1999 an unknown *Agrocybe* was collected from a heating heap of woodchips in the city of Rotterdam, the Netherlands by Gerrit Keizer. Since then, the *Agrocybe* has been found on several places in the western part of the Netherlands, always on (heaps of) woodchips. It is now also known from the eastern part (Dam, 2003), and recently from Luxembourg (M. T. Tholl, pers. comm.).

The original collection had a noteworthy radially venose yellow-brown cap, a large but evanescent ring, and a remarkable striate stipe with a thick ball of mycelium at the base. Microscopically the new *Agrocybe* is characterized by large spores, on average $11.5\text{--}12 \times 7\text{--}8 \mu\text{m}$, and the clavate to pedicellate globose cystidia. No pileocystidia could be found. The robust fruit-bodies reminded a bit of *Agrocybe putaminum*, another species on woodchips which is now very common in the western part of the country. Because of an increased use of woodchips on footpaths in woods and parks, several species growing on woodchips have become more common now. The velvety cap and lack of ring distinguishes *Agrocybe putaminum* morphologically from the new species, besides microscopical differences. On the other hand the morphological resemblance with a remarkably wrinkled *Agrocybe cylindracea* is also striking, but again, the microscopy is rather different. *Agrocybe cylindracea* var. *rugosovenosa* Singer (1953) is distinguished by the wrinkled cap, but also this taxon has a different microscopy. *Agrocybe putaminum* and *A. cylindracea* have smaller and narrower spores with a less conspicuous germ pore, differently shaped cheilocystidia and pileocystidia are present. Comparison with other species occurring outside the region covered by the Flora agaricina neerlandica,

led to the originally North-American *Agrocybe acericola*, of which a possible find in Scandinavia is described by Watling (1988). But also this species differs in spore size and shape of cystidia, viz. spores $7.5\text{--}9.5 \times 5\text{--}6 \mu\text{m}$ and cheilocystidia vesiculose.

It is remarkable that this is the second new agaric which is discovered on heating heaps within a short period of time. In 1997 *Agaricus rufotegulis* was discovered in the Netherlands and south England on heating heaps of rotting leaves (Nauta, 1999). Meanwhile, that species has also been found in Portugal (Hausknecht, 2002), but unfortunately it has not been found since in the Netherlands.

Agrocybe rivulosa belongs to subgen. *Agrocybe* sect. *Agrocybe* on account of the conspicuous wide germ pore, the large spores, form of the cystidia and lack of pileocystidia.

***Agrocybe rivulosa* Nauta, spec. nov. — Fig. 1**

Pileus 40–100 mm diametro, convexus ad applanatus, hygrophanus, spadiceus vel flavobrunneus, in sicco pallescens; rivulosus. Lamellae emarginatae, brunneae. Stipes 50–115 mm longus, 5–15 mm crassus, semibulbosus, annulatus, curvatus, infra anulum valde fibrillosus, rhizomorphis albidis. Annulus 5–15 mm latus descendens, tenuis. Caro sapore farinoso.

Sporae $10.0\text{--}14.0 \mu\text{m}$ longae, in medio $11.5\text{--}12.0 \mu\text{m}$, $(6.0\text{--}6.5\text{--}8.0\text{--}8.5) \mu\text{m}$ latae, in medio $7.0\text{--}8.0 \mu\text{m}$, $Q = 1.45\text{--}1.80$, in medio $(1.55\text{--})1.60\text{--}1.70$, ellipsoideae vel oblongae, cum poro germanitivo evidenti. Basidia 4-sporigera. Lamellae margine cheilocystidiis et basidiis. Cheilocystidia clavata ad pedicellata globosa, $35\text{--}60 \times 20\text{--}30 \mu\text{m}$. Pleurocystidia rara, cheilocystidiis staturae et formae similis. Pileipellis cellulis pyriformibus ad clavatis, $20\text{--}40\text{--}(55) \times (14\text{--})20\text{--}30\text{--}(35) \mu\text{m}$, stratis gelatinosis $50 \mu\text{m}$ tectus. Pileocystidia rara vel nulla, utriformia.

Holotypus: The Netherlands, Rotterdam, X.1999, G. Keijzer (MN 8109; L).

Vernacular name — Geaderde leemhoed.

Carpophores in groups or fasciculate. Cap (30–)40–100 mm in diameter, young truncately conical, soon convex to plano-convex or applanate with a conspicuous umbo, hygrophanous, in wet condition young warm brown, later yellow-brown (Mu. 10 YR 7/4–8) at centre, paler towards margin, pallescent on drying to pale yellow or pale yellowish brown; surface young glutinous and smooth, later dry and strongly radially venose; young with dirty white to greyish veils, later margin often with short fringe of whitish veil remnants. Lamellae moderately crowded, emarginate, 4–8 mm broad, at first pale yellow to grey-brown, later darker to (greyish) brown (10 YR 6/3–4; 7.5 YR 4/4), with slightly paler, minutely denticulate edge. Stipe 50–115 \times (3–)5–15 mm, annulate, cylindrical, often with bulbous base up to 16 mm, curved, white in upper part, pale yellowish brown downwards, becoming brownish on handling in lower part, above ring smooth to pruinose, below ring strongly striate-fibrillose; at base white tomentose, with several small white rhizomorphs, often with large mycelial tangle. Ring at 0.60–0.75 of height of stipe, 5–15(–20) mm wide, often partly attached to margin of cap, descending, slightly spreading, fragile, thin, easily torn, whitish, with smooth to slightly striate upperside; underside smooth or sometimes fibrillose or with some small teeth at margin. Context 3 mm thick in cap. Smell indistinct or pleasant, sometimes sweetish. Taste strongly farinaceous. Spore print dark red-brown (7.5 YR 3/4).

Spores $10.0\text{--}14.0 \times (6.0\text{--})6.5\text{--}8.0\text{--}(8.5) \mu\text{m}$, on average $11.5\text{--}12.0 \times 7.0\text{--}8.0 \mu\text{m}$, $Q = 1.45\text{--}1.80$, on average $(1.55\text{--})1.60\text{--}1.70$, ellipsoid to oblong, in side-view often flattened at one side, thick-walled, with a usually conspicuous, $0.8\text{--}1.5 \mu\text{m}$ wide, apical germ pore;

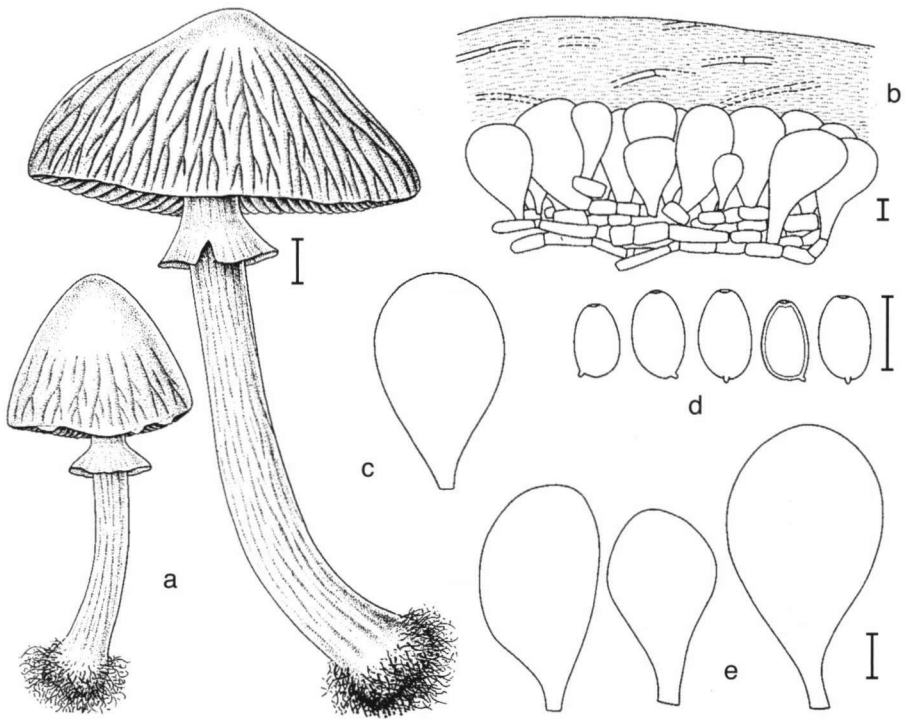


Fig. 1. *Agrocybe rivulosa*. a. Fruit-body; b. pileipellis; c. pleurocystidia; d. spores; e. cheilocystidia. Scale bars: resp. 1 cm, 10 μm .

yellow-brown with light microscope. Basidia usually mostly 4-spored, although a few 2-spored basidia may be present. Lamella edge heterogeneous, composed of cystidia and basidia. Cheilocystidia (20–)35–60 \times (11–)20–30(–35) μm , clavate to sphaeropedunculate, easily collapsed. Pleurocystidia scarce, of same size and shape as cheilocystidia, sometimes larger and up to 130 \times 60 μm , easily collapsed. Pileipellis a 50–100 μm thick hymeniderm, consisting of erect, clavate to pedicellate globose elements of 20–40(–55) \times (14–)20–30(–35) μm , sometimes with irregular fingerlike outgrowths, covered with an up to 50 μm thick gelatinous layer. Veil on cap composed of irregularly interwoven, 3.0–5.0 μm wide hyphae intermixed with inflated elements of c. 30 \times 24–28 μm , with numerous clamp-connections and intracellular and encrusting yellow pigment. Pileocystidia very scarce to absent, utriform, up to 50 \times 15 μm . Clamp-connections abundantly present in stiptipellis and pileipellis, also present at base of basidia.

Habitat & distribution — Gregarious to rarely fasciculate, saprotrophic; on heating heaps of woodchips and on woodchips along paths in city parks. Sept.–March. Rare in the Netherlands, mainly in the western part, also recorded from Luxembourg.

Material studied. THE NETHERLANDS: Zuid-Holland, Leiden, 12.IX.2001, C. Bas 9613; Den Haag, 2002, K. Fokkens; Den Haag, Haagse Bos, 6.XI.2001, L. Bakker & L. Hilbers (MN 8608); Rotterdam, X.1999, G. Keijzer (MN 8109; type); idem, X.1999, G. Keijzer (MN 8108); Noord-Holland, Enkhuizen, X.2002, A. Gutter 744.

KEY TO SPECIES OF AGROCYBE ON WOODCHIPS IN NORTH WESTERN EUROPE

- 1a. Stipe with ring 2
 b. Ring absent 5
- 2a. Spores on average $7.5\text{--}11.0 \times 5.0\text{--}6.0 \mu\text{m}$. Cap smooth or areolate-rimose 3
 b. Spores on average $11.5\text{--}12.0 \times 7.0\text{--}8.0 \mu\text{m}$. Cap remarkably radially rivulose to wrinkled *Agrocybe rivulosa*
- 3a. Cheilocystidia mainly clavate, with some utriform elements, $20\text{--}40 \times 7.0\text{--}16.0$ ($\text{--}19.0$) μm ; spores $8.5\text{--}12.5 \times 5.0\text{--}7.0 \times 4.5\text{--}6.5 \mu\text{m}$, on average $9.5\text{--}11.0 \times 5.0\text{--}6.0 \mu\text{m}$. Cap yellowish white to pale yellow-brown, often areolate-rimose. Taste not farinaceous *Agrocybe cylindracea*
 b. Cheilocystidia only utriform, $35\text{--}65 \times 15.0\text{--}33.0 \mu\text{m}$; spores $7.5\text{--}10.0 \mu\text{m}$ on average. Cap ochre to brown, smooth. Taste farinaceous 4
- 4a. Cap brown, convex with umbo. Spores $7.5\text{--}9.5 \times 5.0\text{--}6.0 \mu\text{m}$
Agrocybe acericola sensu Watling (1988)
 b. Cap ochre to yellowish brown, convex to plano-convex. Spores $8.0\text{--}11.0 \times 5.0\text{--}7.5 \times 4.5\text{--}6.5 \mu\text{m}$, on average $8.5\text{--}10.0 \times 5.5\text{--}6.5 \times 5.0\text{--}6.0 \mu\text{m}$. . . *Agrocybe praecox*
- 5a. Cap velvety, dark yellow-brown to dark brown, sometimes olivaceous 6
 b. Cap smooth, yellow-brown. Cystidia with characteristic fingerlike projections
Agrocybe arvalis
- 6a. Cap without olivaceous tinge, $20\text{--}70$ mm in diameter; stipe $4\text{--}8$ mm wide. Spores with conspicuous germ pore, on average $10.5\text{--}11.5 \times 6\text{--}7 \mu\text{m}$
Agrocybe putaminum
 b. Cap usually with olivaceous tinge, $10\text{--}30$ mm in diameter; stipe up to 3 mm wide. Spores without or with inconspicuous, narrow germ pore, on average $6.5\text{--}7.5 \times 4\text{--}5 \mu\text{m}$ *Agrocybe firma*

ACKNOWLEDGEMENTS

For sending their collected material I wish to thank G. Keizer (Lelystad), L. Bakker (Wassenaar), C. Bas (Leiden) and A. Gutter (Enkhuizen). J.F. Veldkamp corrected the Latin diagnosis. This study has partly been carried out for the project 'Flora agaricina neerlandica', with a fellowship granted by the 'Rijksherbariumfonds Dr. E. Kits van Waveren'.

REFERENCES

- Dam, N. 2003. De trek naar het oosten. *Coolia* 46 (1): 35–36.
 Hausknecht, A. 2002. *Agaricus rufotegulis* Nauta in Portugal. *Rev. Cat. Micologia* 24: 225–227.
 Nauta, M.M. 1987. Revisie van de in Nederland voorkomende soorten van het geslacht *Agrocybe* (Leemhoeden). Rijksherbarium, Leiden.
 Nauta, M.M. 1999. Notes on *Agaricus* section *Spissicaulis*. *Notulae ad floram agaricinam neerlandicam* XXIII. *Persoonia* 17: 221–233.
 Nauta, M.M. In prep. a. *Agrocybe*. In: M.E. Noordeloos, Th.W. Kuyper & E.C. Vellinga. *Flora agaricina neerlandica* vol. 6.
 Nauta, M.M. In prep. b. Studies in the *Agrocybe* pediades-complex. *Persoonia* 18.
 Singer, R. 1953. Quelques *Agaricus* nouveaux de l'Argentine. *Rev. Mycol.* 18: 3–23.
 Watling, R. 1988. Observations on the *Bolbitiaceae* – 28. Nordic records. *Agarica* 9: 39–59.