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is based on the presence of the tiny aerial shoots (Fig. 2) on younger twigs within the brooms.

The known distribution of dwarf mistletoe infection in Minnesota is shown in Figure 3. This map is based largely on information furnished by state foresters and compiled by John Hall, assistant regional forester, Minnesota Department of Conservation. The southwesterly limits of the botanical ranges of black and white spruces are indicated (Rudolf, 1965a & b). Previously known locations of infected eastern larch are also included (Tainter and French, 1967 & 1968).

The eastern dwarf mistletoe occurs generally over much of its hosts' ranges but is most prevalent in cool, moist bogs or in areas where the relative humidity is comparatively high during much of the growing season (Leggett, 1876; Arthur, 1900; Bernard, 1957).

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BOTANY

Records of the Higher Fungi of Minnesota

MARGARET G. WEAVER* and ROBERT L. SHAFFER**

ABSTRACT—This paper, presenting an annotated list of 203 species of Ascomycetes and Basidiomycetes of Minnesota, is the first published report of the occurrence of many of the species in the state. The collections on which the list is based were made in five Minnesota counties and are deposited in the senior author's herbarium at Faribault, Minnesota, and in the University of Michigan Herbarium at Ann Arbor, Michigan.

Several years of collecting and studying the mushrooms and other fungi of Minnesota have revealed a rich fungous flora in the state. The flora is little known, however, and the paucity of published records of the state's higher fungi has prompted this report.

Publications of the Minnesota Academy of Science contain only two mycological papers of a taxonomic or floristic nature. One is an account of the two Minnesota species of *Aleurodiscus* (Stork, 1943); the other mentions approximately 50 species of higher fungi from the vicinity of Winona (Sister M. Sylvia, 1938).

The collections reported in this paper were made in the following localities:

(1) Itasca State Park (abbreviated ISP in the annotated list), Clearwater County. The forests contain white, red, and jack pine, balsam fir, spruce, white cedar, and various hardwoods.

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** Dr. Shaffer earned B.S. and M.S. degrees at Kansas State University in 1951 and 1952, respectively, and received his Ph.D. from Cornell University in 1955. He has been on the faculty of the University of Chicago and is presently Curator of Fungi and Associate Professor of Botany at the University of Michigan.

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(2) Between Pelican Lake and Lake Markee (PL), north of Brainerd, Crow Wing County. Three habitats represented in this locality are open, sandy areas; marshes bordering the lakes; and sandy, upland woods with white, red, and jack pine, burr oak, northern red oak, basswood, white birch, and aspen.

(3) St. Croix State Park (SCSP), Pine County. The open woods have chiefly jack pine, aspen, and birch.

(4) East Bethel Village (EBV), Anoka County. Two habitats sampled here are a marsh and an adjacent, sandy, upland woods with red oak predominating.

(5) Faribault (F), Rice County. Lawns with plantings of various woody species are the type of habitat in which collections were made.

(6) In and near Nerstrand Woods State Park (NWSP), Rice County. The upland woods areas have calcareous soils; and the trees are predominantly sugar maple, basswood, red oak, and white and red elms.

Collections made in these few areas during a period of only seven years (1961-1967) are not considered to include the complete higher fungous flora of Minnesota and additions to the list are planned following further research.

Most collections were identified by the authors, but some were determined by specialists in the taxonomy of various fungous groups. Dr. William C. Denison (abbreviated WCD in the annotated list) and Dr. D. W. French (DWF) determined the Ascomycetes; Dr. K. A. Harrison (KAH), the Hydnaceae; Dr. Ronald H. Peterson (RHP), the Clavariaceae; Dr. Alexander H. Smith (AHS), some gill mushrooms and boletes; and Dr. Walter H. Snell (WHS), the Boletaceae.

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Annotated List

The list is divided into Ascomycetes and Basidiomycetes, and under each of these headings, families, genera, and species are arranged alphabetically. The fruiting habit and habitat is given for each species and then, for each collection of a species, the locality, date, and collection number. Commonly-used synonyms of some specific names are given in brackets.

Ascomycetes

Clavicipitaceae

Cordyceps clavulata (Schw.) Ell. & Ev.

Scattered to gregarious on scale insects on branches of live ash and elm trees. ISP, 1 Aug 1967, *MGW 1438a* (det. DWF).

Gloeoglossaceae

Gloeoglossum difforme (Fr.) Durand

Gregarious to cespitose on humus among moss. NWSP, 27 Jul 1962, *MGW N2* (det. WCD).

Pezizaceae

Aleuria aurantia (Pers. ex Fr.) Fckl. [*Peziza aurantia* Pers. ex Fr.]

Gregarious to cespitose on bare soil. NWSP, 3 Sep 1962, *MGW N6* (det. WCD).

Galactinia succosa (Berk.) Sacc. [*Peziza succosa* Berk.]

Solitary on humus. NWSP, 29 Jul 1962, *MGW CC5* (det. WCD).

Helvella crispa Fr.

Scattered, gregarious, and cespitose on humus, leaf mold, and woody debris. PL, 11 Sep 1964, *MGW 1108*; NWSP, 19 Aug 1962, *MGW N2*; 14 Sep 1962, *MGW N4*.

H. elastica Bull. ex St. Amans

Scattered, gregarious, and cespitose on humus. PL, 19 Jul 1965, *MGW 1210*; NWSP, 9 Jul 1961, *MGW N7*; 2 Jul 1965, *MGW 1174*.

H. macropus (Pers. ex Fr.) Karst. [*Paxina hispida* (Schaeff.) Seaver]

Scattered to gregarious on humus. NWSP, 24 Aug 1962, *MGW N4* (det. WCD, collection in MGW Herbarium only).

Humaria hemisphaerica (Wiggers ex Fr.) Fckl. [*Patella albida* (Schaeff.) Seaver]

Gregarious to cespitose on humus among moss. PL, 8 Jul 1962, *MGW P8* (det. WCD, collection in MGW Herbarium only).

Morchella esculenta Pers. ex St. Amans

Solitary, scattered, and gregarious on humus. F, 29 May 1961, *MGW Y1*; 18 May 1962, *MGW Y1*; 30 May 1962, *MGW Y1*; 16 May 1963, *MGW Y1*; 19 May 1965, *MGW 1119*; 21 May, 1965, *MSW 1121* NWSP May 1962, *MGW CF10*.

Peziza sylvestris (Boud.) Sacc. & Trott.

Solitary and scattered on humus and woody debris. NWSP, 24 Jun 1962, *MGW CC6* (det. WCD); 30 June 1962, *MGW N6* (det. WCD, collection in MGW Herbarium only).

Sarcoscyphaceae

Galiella rufa (Schw.) Nannf. & Korf [*Bulgaria rufa* Schw.]

Solitary to cespitose on fallen branches. NWSP, 22 Jul 1961, *MGW N4* (det. WCD, collection in MGW Herbarium only); 30 Jun 1962, *MGW N9* (det. WCD).

Sarcoscypha coccinea (Scop. ex Fr.) Lambotte [*Plectania coccinea* (Scop. ex Fr.) Fckl.]

Scattered on fallen branches. NWSP, 15 Oct 1961, *MGW N13*; (det. WCD); 14 Sep 1962, *MGW N5* (det. WCD). *S. occidentalis* (Schw.) Sacc. [*Plectania occidentalis* (Schw.) Seaver]

Scattered to gregarious on buried sticks. NWSP, 18 Jun 1961, *MGW N3* (det. WCD).

Urnula craterium (Schw. ex Fr.) Fr.

Solitary to cespitose on fallen branches. NWSP, 4 May 1964, *MGW N₃*.

Xylariaceae

Daldinia concentrica (Bolt. ex Fr.) Ces. & de N.

Scattered and gregarious on stumps and fallen branches. ISP, 21 Aug 1964, *MGW 1010*; NWSP, 18 Jun 1961, *MGW N4*; 25 Oct 1961, *MGW N8a*.

Xylosphaera polymorpha (Pers. ex Mérat) Dumort. [*Xylaria polymorpha* (Pers. ex Mérat) Grev.]

Scattered, gregarious, and cespitose on logs, humus, and moss. F, 7 Jun 1962, *MGW Y4*; NWSP, 25 May 1962, *MGW N3*; 9 Jun 1962, *MGW N12*.

Basidiomycetes

Agaricaceae

Agaricus arvensis Schaeff. ex Secr.

Scattered and gregarious on humus and Norway spruce needles. F, 2 Sep 1964, *MGW 1051*; 3 Sep 1964, *MGW 1055*.

A. placomyces Pk.

Gregarious to cespitose on humus under blue spruce. F, 3 Sep 1964, *MGW 1057*.

Amanitaceae

Amanita gemmata (Fr.) Gill. [*A. rus-suloides* Pk.]

Solitary and gregarious on humus. PL, 7 Jul 1962, *MGW P5*; NWSP, 29 Jul 1962, *MGW CC4*.

A. muscaria (L. ex Fr.) Pers. ex Hook.

Scattered and gregarious on humus. PL, 10 Aug 1961, *MGW P3*.

A. vaginata (Bull. ex Fr.) Vitt. [*Amanitopsis vaginata* (Bull. ex Fr.) Karst.]

Scattered on humus. NWSP, 22 Jul 1961, *MGW N3*.

A. verna (Bull. ex Fr.) Pers. ex Vitt. Gregarious to cespitose on humus. PL, 9 Sep 1966, *MGW 1266*.

Astraeaceae

Astraeus hygrometricus (Pers.) Morg. [*Geaster hygrometricus* Pers.]

Scattered to gregarious on humus. PL, 25 Aug 1967, *MGW 1471*.

Auriculariaceae

Auricularia auricula (L. ex Hook.) Underw. [*A. auricula-Judae* (Bull. ex Schw.) Schroet.]

Gregarious to cespitose on log. PL, 16 May 1965, *MGW 1118*.

Bolbitiaceae

Agrocybe acericola (Pk.) Sing. [*Pholiota acericola* Pk.]

Gregarious to cespitose on humus, rotten logs, and woody debris. NWSP, 24 Jun 1962, *MGW CC5*; 25 Aug 1963, *MGW N4*.

A. dura (Bolt. ex Fr.) Sing. [*Pholiota dura* (Bolt. ex Fr.) Quéf.]

Scattered on compost pile. F, 5 Jun 1965, *MGW 1135*.

A. semiorbicularis (Bull. ex St. Amans) Fayod [*Naucoria semiorbicularis* (Bull. ex St. Amans) Quéf.]

Scattered to gregarious on humus. F, 10 Jul 1967, *MGW 1409*.

Conocybe crispa (Longyear) Sing. [*Galera crispa* Longyear] Scattered on humus. F, 2 Jul 1967, *MGW 1389*.

Boletaceae

Boletellus russellii (Frost) Gilb. [*Boletus russellii* Frost]

Gregarious on humus. PL, 7 Aug 1961, *MGW P3* (det. WHS, collection in MGW Herbarium only).

Boletinus pictus (Pk.) Pk.

Scattered to gregarious on humus. PL, 12 Sep 1964, *MGW 1087*.

B. spectabilis Pk.

Scattered in sphagnum bog under larch. PL, 19 Sep 1966, *MGW 1352*.

Fuscoboletinus weaverae A. H. Sm. & Shaffer

Scattered to cespitose on humus. PL, 12 Sep 1964, *MGW 1086*.

Gyroporus purpurinus (Snell) Sing. [*Boletus castaneus* Bull. ex Fr. f. *purpurinus* Snell]

Gregarious to cespitose on humus. NWSP, 7 Aug 1962, *MGW N4* (det. WHS).

Leccinum atrostepitatum A. H. Sm.

Solitary on humus. NWSP, 22 Jun 1966, *MGW 1299*.

L. aurantiacum (Bull. ex St. Amans) S. F. Gray [*Boletus aurantiacum* Bull. ex St. Amans]

- Solitary to cespitose on humus. PL, 5 Oct 1961, *MGW P22*; 10 Jul 1962, *MGW P7*; 14 Jun 1963, *MGW P4* (det. WHS, collections in MGW Herbarium only).
L. oxydabile (Sing.) Sing.
 Gregarious on humus. PL, 8 Aug 1961, *MGW P3* (det. WHS, collection in MGW Herbarium only).
L. scabrum (Bull. ex Fr.) S. F. Gray subsp. *scabrum* [*Boletus scaber* Bull. ex Fr.]
 Solitary on humus. PL, 4 Oct 1961, *MGW P20* (det. WHS, collection in MGW Herbarium only).
L. subleucophaeum Dick & Snell
 Solitary on humus. PL, 10 Jul 1962, *MGW P10* (det. WHS, collection in MGW Herbarium only).
Strobilomyces floccopus (Vahl ex Fr.) Karst. [*S. strobilaceus* (Scop. ex Fr.) Berk.]
 Solitary and gregarious on humus. NWSP, 29 Jul 1962, *MGW CC7* (det. WHS, collection in MGW Herbarium only); 8 Aug 1965, *MGW 1218*.
Suillus americanus (Pk.) Snell [*Boletus americanus* Pk.]
 Solitary to gregarious and cespitose on humus. PL, 7 Aug 1963, *MGW P1* (det. WHS, collection in MGW Herbarium only); 12 Sep 1964, *MGW 1089*.
S. granulatus (L. ex Fr.) Kuntze subsp. *snellii* Sing. [*Boletus granulatus* L. ex Fr.]
 Solitary and scattered on humus. PL, 6 Oct 1961, *MGW P31*; 9 Aug 1963, *MGW P1* (det. WHS, collections in MGW Herbarium only).
S. tomentosus (Kauff.) Sing., Snell, & Dick [*Boletus tomentosus* Kauff.]
 Gregarious on humus. PL, 13 Sep 1964, *MGW 1105*.
Tylopilus felleus (Bull. ex Fr.) Karst. [*Boletus felleus* Bull. ex Fr.]
 Gregarious to cespitose on humus. NWSP, 8 Aug 1965, *MGW 1217*.
T. plumbeoviolaceus (Snell) Snell & Dick [*Boletus felleus* f. *plumbeoviolaceus* Snell]
 Gregarious on humus. NWSP, 27 Jul 1962, *MGW N6* (det. WHS).
- Cantharellaceae**
Cantharellus cibarius Fr.
 Scattered on humus. PL, 8 Jul 1962, *MGW P13a*.
Craterellus cornucopioides (L. ex Fr.) Pers.
 Gregarious and cespitose on humus among moss. PL, 13 Jul 1966, *MGW 1315*; NWSP, 7 Jul 1966, *MGW 1307*.
- Clavariaceae**
Aphelaria tuberosa (Grev.) Corner [*Lachnocladium semivestitum* Berk. & Br.]
 Scattered to gregarious on bare soil and woody debris. NWSP, 24 Aug 1962, *MGW N6* (det. RHP).
Clavaria longispora Corner
 Gregarious on humus. NWSP, 29 Aug 1965, *MGW 1241* (det. RHP).
C. vermicularis Fr.
 Gregarious to cespitose on humus. NWSP, 24 Jul 1961, *MGW N5* (det. RHP).
Clavariadelphus ligula (Fr.) Donk [*Clavaria ligula* Fr.]
 Gregarious on humus and pine needles. ISP, 22 Aug 1964, *MGW 1014*.
- C. pistillaris* (Fr.) Donk f. *americana* Corner [*Clavaria pistillaris* Fr.]
 Gregarious on humus. NWSP, 24 Jul 1962, *MGW N1* (det. RHP).
Clavicornia pyxidata (Fr.) Doty [*Clavaria pyxidata* Fr.]
 Cespitose on logs. ISP, 1 Aug 1967, *MGW 1441*; SCSP, 23 Jun 1967, *MGW 1371*; NWSP, 30 Jun 1967, *MGW 1383*.
Clavulina cinerea (Fr.) Schroet. [*Clavaria cinerea* Fr.]
 Gregarious to cespitose on humus around stump. PL, 10 Jul 1962, *MGW P1* (det. RHP).
Clavulinopsis aurantio-cinnabarina (Schw.) Corner var. *amoena* (Zoll. & Mor.) Petersen [*Clavaria amoena* Zoll. & Mor.]
 Gregarious to cespitose on humus. NWSP, 20 Jul 1962, *MGW N1* (det. RHP).
C. corniculata (Fr.) Corner [*Clavaria corniculata* Fr.]
 Gregarious on bare soil near stump. NWSP, 29 Aug 1965, *MGW 1242*.
Lentaria byssiseda (Fr.) Corner [*Clavaria byssiseda* Fr.]
 Cespitose on leaf mold, wood chips, and other woody debris. PL, 7 Sep 1965, *MGW 1249* (det. RHP).
Physalacria inflata (Schw.) Pk.
 Scattered, gregarious, and cespitose on fallen branches. NWSP, 12 Oct 1961, *MGW N12*; 20 Sep 1963, *MGW N9* (det. RHP).
Ramaria crassipes (Pk.) Petersen [*Clavaria crassipes* Pk.]
 Gregarious on humus. NWSP, 22 Aug 1965, *MGW 1233* (det. RHP).
R. suecica (Fr.) Donk. [*Clavaria suecica* Fr.]
 Scattered to gregarious on humus. PL, 12 Sep 1964, *MGW 1098*.
Ramariopsis asterella (Atk.) Corner [*Clavaria asterella* Atk.]
 Gregarious on humus. NWSP, 3 Aug 1962, *MGW N9* (det. RHP).
R. kunzei (Fr.) Donk [*Clavaria kunzei* Fr.]
 Scattered to gregarious on humus and among moss. PL, 12 Sep 1964, *MGW 1097*; NWSP, 3 Aug 1962, *MGW N8*; 22 Aug 1965, *MGW 1235* (det. RHP).
- Coprinaceae**
Coprinus atramentarius (Bull. ex Fr.) Fr.
 Cespitose on log. NWSP, 18 Jun 1965, *MGW 1160*.
C. comatus (Müll. ex Fr.) S. F. Gray
 Gregarious to cespitose on humus. F, 3 Oct 1963, *MGW F1*.
C. disseminatus (Pers. ex Fr.) S. F. Gray [*Psathyrella disseminata* Pers. ex Fr.]
 Cespitose on stump and on humus among moss. NWSP, 13 Jun 1965, *MGW 1149*.
C. micaceus (Bull. ex Fr.) Fr.
 Cespitose on logs. F, 8 May 1962, *MGW F1*; NWSP, 13 Jun 1965, *MGW 1148*.
C. quadrididus Pk.
 Gregarious and cespitose on humus next to rotten log. NWSP, 14 Jun 1966, *MGW 1295*.
Panaeolus foenicicii (Pers. ex Fr.) Schroet. [*Psilocybe foenicicii* (Pers. ex Fr.) Quél.]
 Gregarious on humus. F, 3 Jun 1962, *MGW Y2*.
- Psathyrella candolleana* (Fr.) Marie f. *incertum* (Pk.) Sing. [*Hypholoma incertum* (Pk.) Sacc.]
 Gregarious to cespitose on humus near rotted stump. F, 5 Jun 1962, *MGW Y3*.
- Cortinariaceae**
Cortinarius cinnamomeus (L. ex Fr.) Fr.
 Scattered to cespitose on humus among moss under jack pine. PL, 23 Sep 1965, *MGW 1272*.
Crepidotus calolepis (Fr.) Karst. [*C. fulvotomentosus* Pk.]
 Imbricate on log. NWSP, 20 May 1962, *MGW N1*.
C. crocophyllus (Berk.) Sacc. [*C. dorsalis* Pk.]
 Scattered and gregarious on log. NWSP, 27 Sep 1963, *MGW N6*; 25 May 1965, *MGW 1129*.
C. nephrodes (Berk. & Curt.) Sacc. [*C. putrigenus* (Berk. & Curt.) Sacc.; *C. malachius* (Berk. & Curt.) Sacc.]
 Cespitose on log. NWSP, 10 May 1964, *MGW N2*.
Galerina autumnalis (Pk.) A. H. Sm. & Sing. [*Pholiota autumnalis* Pk.]
 Gregarious to cespitose on log. NWSP, 20 Sep 1963, *MGW N1* and *MGW N5*.
Gymnopilus junonius (Fr.) Orton [*Pholiota spectabilis* (Fr.) Gill.]
 Cespitose on stump. F, 19 Jun 1962, *MGW F1*.
Inocybe geophylla (Sow. ex Fr.) Kumm.
 Scattered and gregarious on humus. NWSP, 7 Aug 1962, *MGW N1*.
I. lilacina (Boud.) Kauff.
 Scattered to gregarious on humus. NWSP, 13 Sep 1961, *MGW N28*; 20 Sep 1963, *MGW N7a*.
I. pyriodora (Pers. ex Fr.) Kumm.
 Scattered to gregarious on charcoal debris. NWSP, 7 Aug 1962, *MGW N10*.
Pholiota aurivella (Batsch ex Fr.) Quél. [*P. adiposa* (Fr.) Kumm. in the sense of some American authors]
 Cespitose on log. NWSP, 28 Aug 1964, *MGW 1040*.
P. polychroa (Berk.) A. H. Sm. & Brodie [*Flammula polychroa* (Berk.) Sacc.]
 Gregarious and cespitose on logs and fallen branches. NWSP, 27 Jul 1962, *MGW N5*; 3 Sep 1962, *MGW N10*; 27 Sep 1963, *MGW N3*.
P. spumosa (Fr.) Sing. [*Flammula spumosa* (Fr.) Kumm.]
 Cespitose among moss around stump. PL, 4 Oct. 1961, *MGW P17*.
P. tuberculosa (Schaeff. ex Fr.) Kumm.
 Scattered and gregarious on log. NWSP, 22 Jul 1967, *MGW 1427*; 28 Jul 1967, *MGW 1474*.
Rozites caperatus (Pers. ex Fr.) Karst. [*Pholiota caperata* (Pers. ex Fr.) Kumm.]
 Scattered to gregarious on humus. PL, 2, Oct. 1965, *MGW 1284*.
- Geastraceae**
Geastrum fimbriatum Fr.
 Scattered to gregarious on humus. PL, 7 Sep 1965, *MGW 1251*.
- Gomphidiaceae**
Gomphidius rutilus (Schaeff. ex Fr.) Lundell [*G. viscidus* L. ex Fr.]

Scattered on humus under jack pine. PL, 10 Sep 1965, *MGW 1265*.

Hydnaceae

Auriscalpium valgare S. F. Gray [*Hydnum auriscalpium* Fr.]

Scattered, gregarious, and cespitose on cones of jack pine. PL, 8 Jul 1962, *MGW P2*.

Dentinum repandum (Fr.) S. F. Gray [*Hydnum repandum* Fr.]

Gregarious to cespitose on humus. NWSP, 17 Aug 1962, *MGW N2* (det. KAH).

Gloiodon strigosus (Fr.) Karst.

Scattered to cespitose on stump. NWSP, 23 Jul and 28 Aug 1967, *MGW 1434* (det. KAH).

Hericium coralloides (Scop. ex Fr.) S. F. Gray

Scattered on dead tree trunk. NWSP, 18 Sep 1965, *MGW 1270* (det. KAH).

H. ramosum (Bull. ex Mérat) Letellier [*Hydnum coralloides* Scop. ex Fr. in part; *Hericium lacinatum* Leers ex Banker]

Gregarious to cespitose on log. NWSP, 4 Aug 1965, *GW 1072* (det. KAH).

Hydnum scrobiculatum (Fr. ex Secr.) Karst. var. *scrobiculatum* Hydnum scrobiculatum Fr. ex Secr.] Secr.]

Gregarious and cespitose on humus and woody debris. 23 Aug 1965, *MGW 1237* (det. KAH).

Steccherinum adustum (Schw.) Banker [*Hydnum adustum* Schw.]

Solitary to imbricate on logs. NWSP, 20 Jun 1962, *MGW N2*; 7 Sep 1962, *MGW N18* (det. KAH).

Hygrophoraceae

Hygrophorus cantharellus (Schw.) Fr. Gregarious to cespitose on humus among moss. NWSP, 13 Jun 1965, *MGW 1156*.

H. conicus (Scop. ex Fr.) Fr.

Solitary, scattered, and gregarious on humus. PL, 8 Jul 1962, *MGW P13*; NWSP, 11 Jul 1967, *MGW 1413*.

H. eburneus (Bull. ex Fr.) Fr.

Gregarious to cespitose on humus. PL, 5 Oct 1961, *MGW P35*.

H. kauffmanii A. H. Sm & Hesler Gregarious to cespitose on humus. NWSP, 21 Sep 1962, *MGW N9*.

H. minutulus Pk.

Scattered to gregarious on humus. NWSP, 27 Jul 1962, *MGW N10* (det. AHS).

H. russula (Schaeff. ex Fr.) Quél.

Cespitose on humus. NWSP, 18 Sep 1965, *MGW 1269*.

H. virgineus (Wulf. ex Fr.) Fr.

Gregarious to cespitose on humus. NWSP, 8 Aug 1965, *MGW 1223*.

Hysterangiaceae

Hysterangium stoloniferum Tul.

Partially or completely buried in humus. NWSP, 6 Jun 1965, *MGW 1140*.

Lepiotaceae

Lepiota alba (Fr.) Bres.

Solitary on humus in open area. F, 11 Sep 1966, *MGW 1351*.

L. clypeolaria (Bull. ex Fr.) Kumm.

Gregarious on humus. PL, 10 Jun 1963, *MGW P2*.

L. leucothites (Vitt.) Orton [*L. naucina* (Fr.) Kumm.]

Solitary to gregarious on humus. F, 28 Aug 1964, *MGW 1038*.

L. rhacodes (Vitt.) Quél.

Scattered, gregarious, and cespitose on humus. F, 1-4 Sep 1964, *MGW 1066*; NWSP, 1 Sep 1966, *MGW 1350*. *L. rubrotincta* Pk.

Solitary and gregarious on humus. F, 3 Sep 1964, *MGW 1058*; 6 Sep 1964, *MGW 1075*.

L. seminuda (Lasch) Kumm.

Gregarious to cespitose on humus and woody debris. NWSP, 4 Sep 1964, *MGW 1067*.

Lycoperdaceae

Lycoperdon pyriforme Pers.

Scattered to cespitose on logs. NWSP, 12 Oct 1961, *MGW N8*; 17 Jul 1962, *MGW N3*.

Nidulariaceae

Cyathus straiatus Pers.

Gregarious to cespitose on log. F, 21 Jul 1962, *MGW F1*.

Phallaceae

Dietyophora duplicata (Bosc) E. Fisch. Solitary on humus. PL, 24 Sep 1965, *MGW 1279*.

Mutinus caninus (Pers.) Fr. [*M. ravenelii* (Berk. & Curt.) E. Fisch.]

Solitary on humus. PL, 24 Sep 1965, *MGW 1278*.

Phallus impudicus Pers. [*Ithyphallus impudicus* (Pers.) E. Fisch.]

Scattered to gregarious on humus among dead stumps and roots. F, 31 May 1964, *MGW F1*; 30 Jun-1 Jul 1965, *MGW 1172*.

Polyporaceae

Antrodia stereoides (Fr.) Bond. & Sing. [*Polyporus planellus* (Murr.) Overh.]

Solitary to cespitose on log and fallen branch. NWSP, 26 Jun 1962, *MGW N2*; 20 Jul 1962, *MGW N13*.

Coltricia perennis (L. ex Fr.) Murr. [*Polyporus perennis* L. ex Fr.]

Scattered and gregarious on humus. PL, 26 Jun 1965, *MGW 1167*.

Fomes ohiensis (Berk.) Murr.

Scattered and gregarious on logs. NWSP, 25 Oct 1965, *MGW N9*.

Hapalopilus fibrillosus (Karst.) Bond. & Sing. [*Polyporus fibrillosus* Karst.]

Imbricate on birch log. ISP, 22 Aug 1964, *MGW 1024*.

Lenzites betulina (L. ex Fr.) Fr.

Scattered, gregarious, and cespitose on birch logs. ISP, 21 Aug 1964, *MGW 1011*

Polyporus alveolaris (DC. ex Fr.) Bond. & Sing. [*Favolus alveolaris* DC. ex Fr.; *F. canadensis* Klotzsch]

Gregarious on log. NWSP, 21 May 1965, *MGW 1122*.

P. arcularius (Batsch) ex Fr.

Scattered, gregarious, and cespitose on logs and buried woody debris. F, 25 May 1965, *MGW 1128*.

P. brumalis (Pers.) ex Fr.

Scattered to gregarious on logs. NWSP, 21 May 1965, *MGW 1123*.

P. elegans (Bull.) ex Fr.

Scattered, gregarious, and cespitose on log. NWSP, 13 Jun 1965, *MGW 1151*.

P. squamosus Mich. ex Fr.

Scattered and imbricate on logs. F, 25 May 1965, *MGW 1127*.

Poronidulus conchifer (Schw.) Murr. [*Polyporus conchifer* (Schw.) Fr.]

Solitary to gregarious on fallen branches. NWSP, 25 Aug 1963, *MGW N6*.

Tyromyces caesius (Schrad. ex Fr.) Murr. [*Polyporus caesius* Schrad. ex Fr.]

Gregarious to cespitose on log. NWSP, 21 Sep 1962, *MGW N8*.

Rhodophyllaceae

Rhodocybe novaeboracensis (Pk.) Sing. [*Clitopilus novaebo racensis* (Pk.) Sacc.]

Gregarious to cespitose on humus among marshy debris. PL, 3 Oct 1966, *MGW 1353*.

Rhodophyllus abortivus (Berk. & Curt.) Sing. [*Clitopilus abortivus* (Berk. & Curt.) Sacc.]

Scattered to gregarious on humus, tree roots, and woody debris. NWSP, 12 Oct 1962, *MGW N3*.

Russulaceae

Lactarius chrysorheus Fr.

Gregarious on humus. PL, 12 Sep 1964, *MGW 1099*.

L. cokeri A. H. Sm. & Hesler

Solitary and gregarious on humus. NWSP, 2 Aug 1961, *MGW N17*; 3 Aug 1962, *MGW N6*.

L. glyciosmus (Fr. ex Fr.) Fr.

Gregarious to cespitose on humus among marshy debris. PL, 9 Sep 1965, *MGW 1260*.

L. piperatus (Scop. ex Fr.) S. F. Gray

Gregarious to cespitose on humus. NWSP, 11 Aug 1965, *MGW 1230*.

L. subdulcis (Pers. ex Fr.) S. F. Gray

Scattered to gregarious on humus and marshy debris. PL, 10 Jul 1965, *MGW 1179*.

L. torminosus (Schaeff. ex Fr.) S. F. Gray

Gregarious to cespitose on humus under jack pine. PL, 10 Sep 1965, *MGW 1263*.

L. trivialis (Fr. ex Fr.) Fr.

Gregarious to cespitose on humus. NWSP, 29 July 1962, *MGW CC2*.

L. volemus (Fr.) Fr.

Gregarious on humus. NWSP, 11 Aug 1965, *MGW 1229*.

Russula aurata (With.) ex Fr.

Scattered to gregarious on humus. NWSP, 4 Sep 1964, *MGW 1061*.

R. brevipes Pk. var. *brevipes* [R. *delica* Fr. in the sense of some American authors]

Solitary on humus. PL, 22 Aug 1964, *MGW 1019*.

R. brevipes var. *acrior* Shaffer

Solitary on humus among needles of red pine. PL, 12 Sep 1964, *MGW 1095*.

R. crustosa Pk.

Solitary on humus. NWSP, 23 Aug 1965, *MGW 1240*.

R. densifolia (Secr.) Gill.

Solitary on humus. PL, 13 Jul 1966, *MGW 1314*.

R. romagnesiana Shaffer

Scattered to gregarious on humus. NWSP, 8 Aug 1965, *MGW 1220*.

Sclerodermataceae

Scleroderma macrorhizon Fr.

Scattered and gregarious on sand. PL, 8 Sep 1965, *MGW 1258*.

Strophariaceae

Hypholoma sublateritium (Fr.) Quél. [*Naematoloma sublateritium* (Fr.) Karst.]

Cespitose on decaying wood. ISP, 21 Aug 1964, *MGW 1003*.

Stropharia semiglobata (Batsch ex Fr.) Quél.

- Gregarious on horse dung in open field. F, 24 Jun 1965, *MGW 1165*.
- Thelephoraceae**
- Cotylidea diaphana* (Schw.) Lentz
Scattered gregarious, and cespitose on humus and twigs under conifer. F, 19 Aug 1963, *MGW F2*.
- Thelephora anthocephala* (Bull.) ex Fr.
Scattered on humus. PL, 19 Jul 1965, *MGW 1211*.
- T. caryophyllea* (Schaeff.) ex Fr.
Gregarious to cespitose on humus. PL, 6 Jul 1962, *MGW P4*.
- T. palmata* (Scop.) ex Fr.
On humus among herbaceous plants. NWSP, 22 Jul 1961, *MGW N6*.
- T. terrestris* Ehrh. ex Fr.
Cespitose on soil among herbs and shrubs. EBV, 7 July 1967, *MGW 1400*.
- Tremellaceae**
- Exidia alba* (Lloyd) Burt
Gregarious and cespitose on log. NWSP, 30 Jul 1967, *MGW 1386*.
- Tremelloglyphus schweinitzii* (Pk.) Atk. [*T. pallidum* (Schw.) Burt]
Gregarious and cespitose on humus. NWSP, 14 Jul 1965, *MGW 1188*.
- Tricholomataceae**
- Armillaria mellea* (Vahl ex Fr.) Kumm.
Gregarious to cespitose on humus and woody debris. PL, 5 Oct 1961, *MGW P16*.
- Clitocybe candicans* (Pers. ex Fr.) Kumm.
Gregarious to cespitose on humus and woody debris. F, 1 Sep 1964, *MGW 1049*; 10 Sep 1964, *MGW 1083*.
- C. catervata* Bigelow
Scattered and gregarious on humus, moss, needles, and woody debris under jack pine. PL, 10 Sep 1965, *MGW 1264*.
- C. epichysium* (Pers. ex Fr.) Bigelow [*Omphalina epichysium* (Pers. ex Fr.) Quél.]
Gregarious to cespitose on log. NWSP, 28 Aug 1964, *MGW 1041*.
- C. flaccida* (Fr.) Kumm.
Scattered to gregarious on humus and woody debris. ISP, 22 Aug 1964, *MGW 1015*.
- C. gibba* (Pers. ex Fr.) Kumm. [*C. infundibuliformis* (Schaeff. ex Fr.) Quél.]
Gregarious on humus among woody debris. PL, 13 Jul 1966, *MGW 1318*.
- C. harperi* Murr.
Cespitose on humus. PL, 4 Oct 1961, *MGW P16*.
- C. odora* (Bull. ex Fr.) Kumm.
Gregarious on humus, leaves, and woody debris. PL, 7 Aug 1963, *MGW P2*.
- C. olearia* (DC. ex Fr.) Maire [*C. illudens* (Schw.) Sacc.]
Cespitose on stump. NWSP, 26 Aug 1962, *MGW N3*.
- Collybia confluens* (Pers. ex Fr.) Quél. [*C. hariolorum* (DC. ex Fr.) Quél.]
Gregarious to cespitose on humus among conifer needles. ISP, 21 Aug 1964, *MGW 1005*.
- C. dryophila* (Bull. ex Fr.) Kumm.
Gregarious to cespitose on humus. PL, 10 Jul 1962, *MGW P11*.
- Crinipellis setipes* (Pk.) Sing.
Gregarious on humus and woody debris. ISP, 22 Aug 1964, *MGW 1017*.
- Cystoderma amianthinum* (Scop. ex Fr.) Fayod [*Lepiota amianthina* (Scop. ex Fr.) Karst.]
Gregarious to cespitose on humus among moss under jack pine. PL, 23 Sep 1965, *MGW 1273*.
- C. cinnabarinum* (Alb. & Schw. ex Secr.) Fayod [*Lepiota cinnabarina* (Alb. & Schw. ex Secr.) Karst.]
Solitary on leaf mold. ISP, 21 Aug 1964, *MGW 1001*.
- Flammulina velutipes* (Curt. ex Fr.) Karst. [*Collybia velutipes* Curt. ex Fr.]
Gregarious to cespitose on base of apple stump. F, Dec. 1961, *MGW Y1*.
- Laccaria amethystea* (Bull. ex Mérat) Murr. [*L. laccata* (Scop. ex Fr.) Cke. var. *amethystina* Vaillant]
Gregarious on moss. NWSP, 14 Jul 1965, *MGW 1185*.
- L. laccata* (Scop. ex Fr.) Cke. [*Clitocybe laccata* (Scop. ex Fr.) Quél.]
Gregarious to cespitose on humus. PL, 14 Jun 1963, *MGW P3*; 27 Jun 1965, *MGW 1169*.
- L. ochropurpurea* (Berk.) Pk. [*Clitocybe ochropurpurea* Berk.]
Scattered to gregarious on humus. NWSP, 30 Aug 1961, *MGW N35*.
- L. trullisata* (Ell.) Pk. [*Clitocybe trullisata* (Ell.) Sacc.]
Scattered to gregarious on sand in open areas. PL, 4 Oct 1961, *MGW P1*.
- Lentinellus vulpinus* (Sow. ex Fr.) Kühner & Maire [*Lentinus vulpinus* (Sow. ex Fr.) Fr.]
Cespitose on log. NWSP, 2 Jul 1965, *MGW 1176*.
- Lepista nuda* (Bull. ex Fr.) Cke. [*Tricholoma nuda* (Bull. ex Fr.) Kumm.]
Gregarious to cespitose on humus among needles and woody debris under European larch. F, 3 Sep 1964, *MGW 1056*.
- Leucopaxillus laterarius* (Pk.) Sing. [*Tricholoma laterarium* (Pk.) Sacc.]
Scattered to gregarious on humus. ISP 21, Jul 1965, *MGW 1193*.
- Lyophyllum decastes* (Fr. ex Fr.) Sing. [*Clitocybe multiceps* Pk.; *C. cartilaginea* Bres.]
Densely cespitose on humus. F, 18 Jun 1962, *MGW F1*.
- Marasmius capillaris Mork.
Gregarious on fallen oak leaves. NWSP, 29 Aug 1965, *MGW 1246*.
- M. delectans* Morg.
Gregarious to cespitose on humus and oak leaves. PL, 7 July 1962, *MGW P3*.
- M. oreades* (Bolt. ex Fr.) Fr.
Gregarious to cespitose in "fairy ring" on humus. F, 25 Aug 1964, *MGW 1036*.
- M. resinus* Pk.
Gregarious to cespitose on fallen leaves, acorns, maple seeds, etc. NW SP, 29 Aug 1965, *MGW 1243*.
- M. rotula* (Scop. ex Fr.) Fr.
Scattered, gregarious, and cespitose on fallen twigs, oak leaves and logs. EBV, 8 Jul 1967, *MGW 1403*; NWSP, 11 Jul 1967, *MGW 1416*.
- M. semihirtipes* Pk.
Gregarious to cespitose on humus, fallen leaves, conifer needles, and partially buried sticks. ISP, 21 Aug 1964, *MGW 1007*; NWSP 28 Aug 1964, *MGW 1043*; 22 Aug 1965, *MGW 1236*.
- M. siccus* (Schw.) Fr.
- Scattered to gregarious on fallen leaves and woody debris. NWSP, 22 Aug 1965, *MGW 1232*.
- Mycena corticola* (Pers. ex Fr.) S. F. Gray
Gregarious on bark of Norway spruce trees. F, 21 Aug 1965, *MGW 1231*.
- M. galericulata* (Scop. ex Fr.) S. F. Gray
Gregarious to cespitose on log. NW SP, 4 Sep 1964, *MGW 1070*.
- M. haematopus* (Pers. ex Fr.) Kumm.
Gregarious to cespitose on logs. NW SP, 7 Jul 1966, *MGW 1306*; 30 Aug 1967, *MGW 1481*.
- M. inclinata* (Fr.) Quél.
Cespitose on rotted stump NWSP, 13 June 1965, *MGW 1152* and *MGW 1158*.
- Oudemansiella radicata* (Rehl. ex Fr.) Sing. [*Collybia radicata* (Rehl. ex Fr.) Quél.]
Solitary on humus. NWSP, 23 Jun 1965, *MGW 1164*; 14 Jun 1966, *MGW 1298*.
- Panellus stypticus* (Bull. ex Fr.) Karst. [*Panus stypticus* Bull. ex Fr.]
Cespitose and imbricate on log. NWSP, 22 Jul 1967, *MGW 1429*.
- Panus rudis* Fr.
Gregarious to cespitose on log. PL, 6 July 1962, *MGW P3*.
- Phylloporia nidulans* (Pers. ex Fr.) Sing. [*Claudopus nidulans* (Pers. ex Fr.) Karst.]
Cespitose on log. NWSP, 13 May 1962, *MGW P1*.
- Pleurotus cornucopiae* (Paul. ex Pers.) Rolland [*P. sapidus* (Schulz. in Kalchbr.) Sacc.]
Gregarious to cespitose on log. NW SP, 28 Aug 1967, *MGW 1478*.
- P. ostreatus* (Jacq. ex Fr.) Kumm.
Cespitose on live mountain ash tree. F, 21 May 1965, *MGW 1120*.
- P. tessulatus* (Bull. ex Fr.) Gill. [*P. ulmarius* (Bull. ex Fr.) Quél. in the sense of some American authors]
Solitary on branch of decaying elm tree. F, 8 Sep 1964, *MGW 1079*.
- Plicatura crispa* (Pers. ex Fr.) Rea [*Trogia crispa* Pers. ex Fr.]
Scattered, gregarious, and cespitose on fallen twigs. PL, 10 Sep 1965, *MGW 1267*.
- Rhodotus palmatus* (Bull. ex Fr.) Maire
Solitary on woody debris and moss. ISP, 1 Aug 1967, *MGW 1442*.
- Schizophyllum commune* Fr.
Scattered to cespitose on trunk and branches of decaying apple tree. F, 9 Jun 1967, *MGW 1367*.
- Tricholoma fallax* Pk.
Gregarious to cespitose on humus among moss, and on needles, lichens, woody debris, etc., under white pine. PL, 8 Sep 1965, *MGW 1254*.
- T. flavovirens* (Pers. ex Fr.) Lundell [*T. equestre* (L. ex Fr.) Kumm.]
Scattered to gregarious on humus. PL, 12 Sep 1964, *MGW 1096*.
- T. ustaloides* Romag.
Scattered to gregarious on humus. NWSP, 17 Sep 1961, *MGW N9*.
- T. virgatum* (Fr. ex Fr.) Kumm.
Scattered to gregarious on humus. PL, 2 Oct 1965, *MGW 1288*; 3 Oct 1966, *MGW 1354*.
- Tricholomopsis platyphylla* (Pers. ex Fr.) Sing. [*Collybia platyphylla*

(Pers. ex Fr.) Kumm.]

Gregarious to caespitose on stump base. NWSP, 30 June 1962, *MGW N5*.
T. rutilans (Schaeff. ex Fr.) Sing.
[*Tricholoma rutilans* (Schaeff. ex Fr.) Kumm.]

Solitary on partially buried wood. PL, 26 Sep 1965, *MGW 1283*.

Xeromphalina campanella (Batsch ex Fr.) Maire [*Omphalia campanella* (Batsch ex Fr.) Kumm.]

Gregarious to caespitose on pine log. SCSP, 23 Jun 1967, *MGW 1372*.

X. caudicinalis (Fr.) Kühner & Maire [*Marasmius caudicinalis* Fr.]

Scattered on pine cone debris. ISP, 22 Aug 1964, *MGW 1018*.

X. kauffmanii A. H. Sm.

Cespitose on moss and rotted stump. NWSP, 18 Jun 1961, *MGW N5*.

X. tenuipes (Schw.) A. H. Sm. [*Collybia tenuipes* (Schw.) Sacc.]

Scattered to gregarious on log. NW SP, 30 May 1965, *MGW 1131*.

Volvariaceae

Pluteus aurantiorugosus (Trop.) Sacc.
[*P. caloceps* Atk.]

Scattered to gregarious in hollow of rotted stump. NWSP, 28 Sep 1962, *MGW N2*; 29 Jun 1963, *MGW N1*.

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GEOGRAPHY

Coleambally Irrigation Area: Herds, Crops, Fruit

LYDA BELTHUIS*

ABSTRACT—Coleambally, a new irrigation unit, to the south of the Murrumbidgee Irrigation Area in Australia, has come into operation since 1960. It is the first land to receive water from the large Snowy Mountain power and water storage development in southeastern New South Wales. This district of some 139,000 acres now produces rice, wheat, hay, vegetables, fat lambs and wool. When all Snowy Mountain structures are completed and reservoirs filled, the irrigation area will be more than tripled in size.

The beginnings of large scale irrigation in inland New South Wales near the Murrumbidgee date from about 1912, when the Burrinjuck Dam on this river was completed. By 1914, 622 farms covering 26,000 acres had been put into operation. This was later enlarged to its maximum of nearly 415,000 acres, some 267,000 irrigated in 1966. Any further developments depended on the Snowy Scheme. (Gogeldrie Weir, W.C.&I.C. Report, 1964).

With completion in 1959 of some Snowy structures, 150,000 acre feet of water moved down the Murrumbidgee, and with completion of more structures by 1962 an additional 20,000 acre feet of water was available. This made possible the first phase of Coleambally.

In addition to surveying the land, it was necessary to provide facilities for carrying the water into the area. Gogeldrie Weir, 16 miles upstream from Darlington Point, completed by the Water Conservation and Irrigation Commission, was opened in July, 1959. This ponds the Murrumbidgee, allowing water to be diverted southward into Coleambally channel. By November, 1959 the offtake regulator on this channel was completed, and water moved into this new service unit, 23 miles of which had been dug by June, 1960. (W.C.&I.C. Report, 1960)

While these structures were being built, the Government sub-divided large land-holdings, and offered units for indefinite lease, beginning in 1960. Various acts had

been passed previously which had made preparation for this. (Irrigation Acts and Yearbooks)

Coleambally Irrigation Area starts south of the Murrumbidgee River near Darlington Point in line with Griffith twenty-one miles to the north, with the former center to the northwest of the developed part. The area stretches some miles eastward so that it also reaches to the south of Leeton. The latitude is about 34° 30' to 35° South. The area is crossed by 146° East longitude and stretches several minutes to either side.

Area of Wiradjuri Tribe

This district was first occupied by aborigines of the tribe Wiradjuri. Sturt and his party, the first white men in the area, came through in 1829 on their way to South Australia via the Murrumbidgee and Murray Rivers. The first settlers in 1838 were illegal squatters. Shortly thereafter various laws were made to legalize settlement and land purchase.

The first settlement was based on cattle grazing, followed by sheep ranching as early as 1843. These animals formed the basis of income on Coleambally until 1960. (T. Finley and T. Langford-Smith, M.I.A.)

A Continental Climate

Coleambally has a mild winter, hot summer, and semiarid continental climate. Winters are subject to morning frosts from time to time but are mild enough for continued growth of pastures, winter grains, and other foliage. The warm season is sufficiently long for the 200-day growing season of cotton. The average rainfall is about 15 inches, but there is considerable variation. Dur-

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