Neth. J. Pl. Path. 90 (1984) 35-39 SHORT COMMUNICATION

A rare leaf spot disease of Scorzonera hispanica, caused by Alternaria scorzonerae (Aderhold) comb. nov.

W.M. LOERAKKER

Plant Protection Service (PD), P.O.B. 9102, 6700 HC, Wageningen, the Netherlands

Accepted 27 September 1983

Scorzonera hispanica (Compositae, tribe Lactuceae), the scorzonera or black salsify is a vegetable that within the European Economic Community (Common Market) is grown only in France, Belgium and the Netherlands. Since the mid seventies the production area is steady enlarging in the Netherlands (De Jong-Stemerding, 1982). There are generally no disease problems. However, in 1982 a serious leaf spot disease occurred in two fields in the province of North Brabant.

The leaves of the affected plants were densily spotted on both sides by relatively small, round, tan brown lesions, each surrounded by a conspicuous purplish or reddish margin. They initiate as very small purple or red dots and expand to c. 5 mm in diameter (Fig. 1A). On the spots scarcely any fungal growth occurred, but after incubation on wet filter paper for c. 15 h at room temperature a characteristic species of *Alternaria* developed on the lesions with many short, unbranched, brown conidiophores, each bearing a single long-beaked muriform brown conidium (Fig. 1C). The fungus could also be isolated directly from diseased tissue with standard isolation techniques and studied in vitro.

The fungus has been only once observed in Western Europe. This record refers to diseased plants in a botanical garden in Münster, W. Germany (Aderhold, 1903). Other records refer to field observations in Eastern Europe, but are rare. The disease was studied first by Aderhold in 1901 in Proskau, Poland. He described the pathogen as *Sporidesmium scorzonerae* (Aderhold, 1903). The classification in *Sporidesmium* (formerly also spelled as *'Sporodesmium')* is without doubt adopted from Kühn (1855), who described under *Sporidesmium* two closely allied pathogens. According to its original concept (Ellis, 1958) however, *Sporidesmium* represents a group of dematiaceous hyphomycetes quite different from *Alternaria* (e.g. in conidiogenesis, see Ellis, 1971). The observations made by Aderhold have been discussed in a Dutch short communication by Ritzema Bos (1904), intending to draw grower's attention to the disease (!). The Russian phytopathologist Zerova (1933) observed the disease in the Ukraine on *Scorzonera tau-saghyz* (vernacular name 'Tau-saghyz'), a rubber-bearing species of *Scorzonera*. She introduced the name *Macrosporium tau-saghyzianum* for the pathogen. At that time species of *Alternaria* in the modern sense were commonly classified in *Macrosporium.* These two genera are synonymous, but the name *Alternaria* has priority (Simmons, 1967), and besides it is officially conserved against *Macrosporium* (see Stafleu et al., 1978). Zerova's description and figures of *M. tau-saghyzianum* match in detail the features of *Sporidesmium scorzonerae* as described by Aderhold. The undetermined species of *Macrosporium* mentioned by

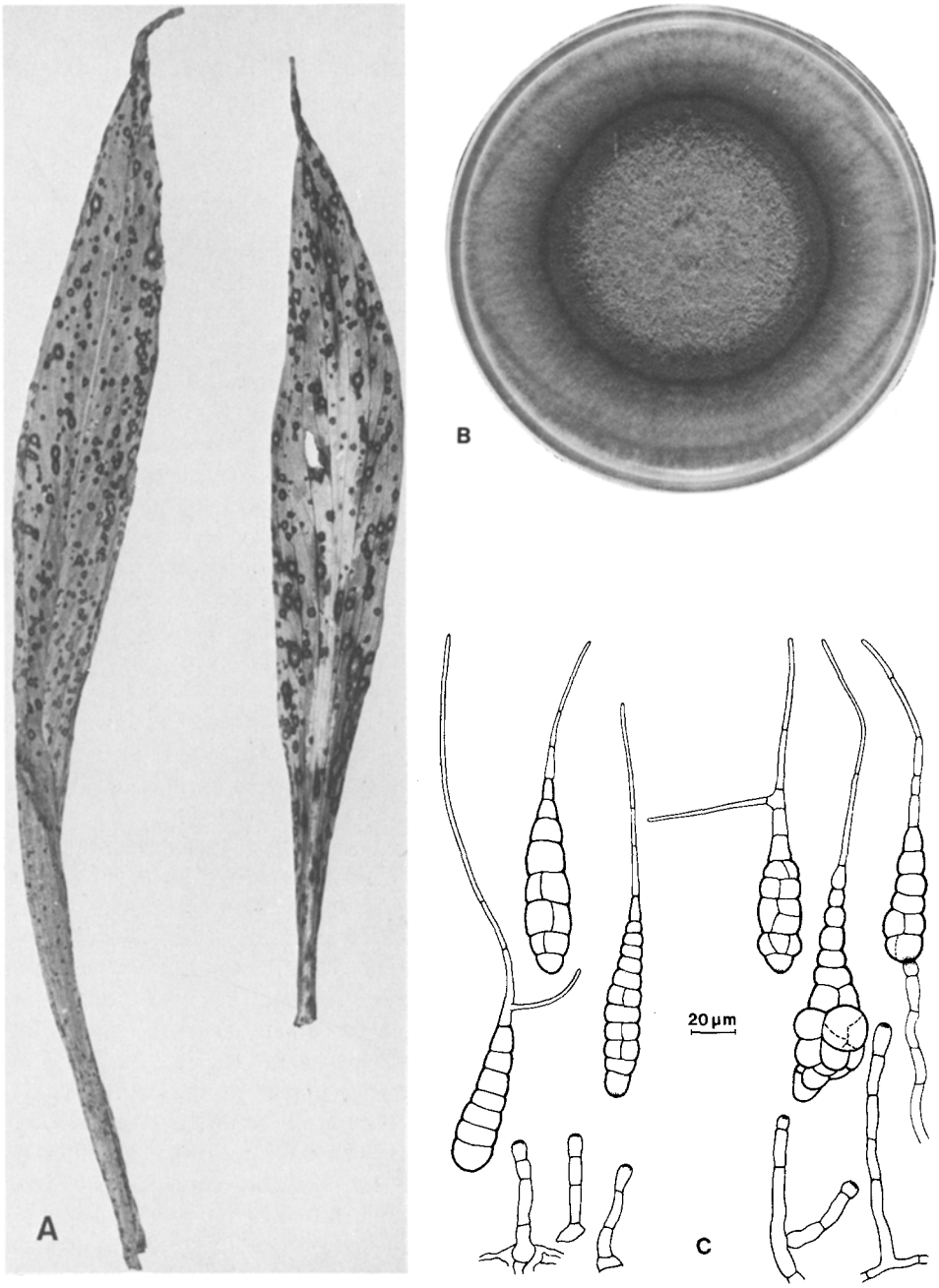

Fig. 1. *Alternaria scorzonerae:* A. Disease symptoms on *Scorzonera hispanica.* B. Two-weeks-old colony on malt extract agar (MEA). C. Conidiophores and conidia in vivo (left) and in vitro (right).

Tcheremissinoff (undated, probably 1936) in a list of parasitic fungi recorded in various regions of the USSR where 'Tau-saghyz' is cultivated as a source of rubber, most probably also refers to the leaf spot fungus under discussion.

As stated above the fungus represents on account of the present classification of dematiaceous hyphomycetes a characteristic species of *Alternaria*. Therefore I propose to transfer its oldest known name to that genus. As only a few concise descriptions are available, a detailed description of the fungus on natural and artificial substrate is given.

ALTERNARIA SCORZONERAE (Aderhold) Loerakker comb.nov.
basionym: *Sporidesmium scorzonerae* Aderhold, Arb. biol. Abt. Land-u. Forstw. 3: 440.1903.
synonym : *Macrosporium tau-saghyzianum* Zerova, Zh. bio.-bot. Tsyklu, Kyev 1933 (7-8): 156.1933.
Representative culture. CBS 478.83.

FUNGAL CHARACTERS IN VIVO (Fig. 1C).
Mycelium immersed. Hyphae 2.3-4.6 (– 5.4) µm wide, hyaline, regularly septate and branched. Conidiophores (30.0–) 41.5-60.0 (– 71.5) µm long, 4.5-6.7 (– 7.5) µm wide, arising singly, straight, (pale-) yellowish brown to reddish brown, 1-3 septate, regular, often slightly inflated at the apex; foot cell trapezoid to subglobose, up to 11.5 µm wide; conidiogenous cell monotretic. Conidia usually solitary, 175-195 µm long, 16-22 µm wide, straight or slightly curved, obclavate, rostrate, pale to mid brown to reddish brown, with 8-14 transverse and 1-6 longitudinal septa; beak up to 120 µm long, (sub-)hyaline, unbranched, but occasionally bifurcate. Botryoid or ulocladioid conidia absent.
FUNGAL CHARACTERS IN VITRO on 4% malt extract agar (MEA) at room temperature after one week incubation in darkness and one week near-ultra-violet (NUV) irradiation with a 15/9 h NUV/dark regime (Fig. 1B, C).
Colony growing fast, almost covering the plate, low, even, zonate, with a regular, entire margin; advancing zone uncoloured, appressed or slightly raised. Aerial mycelium tenuous to rather compact, velvety to cottony, (pale-) grey olivaceous, greenish grey, dull green to very dark green (Rayner, 1970). Reverse with yellow and dark green zones. The yellow diffusible pigment stains the medium outside the colony, and becomes red after addition of NaOH. Crystals absent.
Hyphae (3.0–) 4.0-6.5 (– 7.8) µm wide in the aerial mycelium, 2.7-10.0 µm wide when submerged, regularly septate, strongly guttulate and often densely covered by droplets due to an extruded metabolite. The colony sporulates readily. Conidiophores 25.0-105.0 µm long, 5.3-6.0 µm wide, smooth, pale yellowish brown to reddish brown, straight or flexuous, formed terminally on undifferentiated hyphae, of equal width throughout or somewhat inflated at the apices; conidiogenous cell monotretic, rarely bitretic. Conidia (127.5–) 193.0-276.0 µm long, yellowish brown, slightly constricted at the septa, obclavate, gradually tapering into a long filiform beak, smooth but often covered with exudate droplets; conidial body (25.3–) 57.5-110.0 (– 138.0) × 7.2-10.0 µm, with 7-9 transverse and 0-5 longitudinal septa; conidial beak (54.0–) 94.3-131.0 (– 172.5) µm long, 2.0-3.0 (– 3.9) µm wide in the middle, hyaline, unbranched, bi- or trifurcate, with 0-8 transverse septa; hilum inconspicuous or dark and then slightly protuberant, c. 3-4 µm wide. Botryoid or ulocladioid conidia absent.

A. scorzonerae belongs to the section Noncatenatae (Neergaard, 1945), which is characterized by solitary, short, non-geniculate conidiophores and non-catenate long-beaked conidia. The known members of this section are pathogenic to different hosts, causing leaf spots or leaf blight, and occasionally also lesions on stems and roots. On the various hosts they hardly differ from each other in morphological characters. This

explains why in the past many of these pathogens were regarded as only specialized pathogenic forms (formae speciales) of one collective species (Neergaard, 1945). However, in vitro most of these pathogens can be differentiated by their cultural characters together with small differences in morphology and dimensions of the conidia. Nowadays therefore they are treated as separate species in spite of their morphological resemblance (Boerema & Verhoeven, 1980).

The well-known species of the section that occurs on Lactuceae is *A. cichorii* Nattras. This fungus causes leaf spots on endive, chicory and lettuce (Boerema, 1981). On MEA, *A. cichorii* can easily be distinguished from *A. scorzonerae*. On that medium fresh isolates of *A. cichorii* produce relatively slowly growing colonies with an irregular, crenate outline and also produce an intensily red pigment together with amorphous to floccular-feathery crystals. This phenomenon is also known from other species of the section Noncatenatae (Neergaard, 1945). On MEA colonies of *A. scorzonerae*, however, are characterized by a relatively fast growth (Fig. 1B) and the production of a yellow to yellowish-green diffuse pigment without any trace of crystal production.

Aderhold (1903) noticed that the thickness of the roots of diseased plants was reduced. The yield of roots in the affected fields in North Brabant was also less than could be expected on account of yields of healthy crops in previous years.

Samenvatting

Een zeldzame bladvlekkenziekte bij schorseneer veroorzaakt door Alternaria scorzonerae (Aderhold) comb. nov.

In 1982 is in Nederland op twee plaatsen in Noord-Brabant bij schorseneer een bladvlekkenziekte geconstateerd die werd veroorzaakt door een schimmel die te boek staat als *Sporidesmium scorzonerae* Aderhold (syn. *Macrosporium tau-saghyzianum* Zerova). Het betreft een zeldzaam optredende ziekte, die niet eerder buiten Oost-Europa bij de produktieteelt van schorseneren is aangetroffen. Onderzoek naar de morfologie van de schimmel wees uit dat deze behoort tot Alternaria sect. Noncatenatae. Derhalve werd voor het pathogeen de nieuwe combinatie *Alternaria scorzonerae* (Aderhold) Loerakker geïntroduceerd.

References

Aderhold, R., 1903. Über eine bisher nicht beobachtete Krankheit der Schwarzwurzeln. Arb. biol. Abt. Land- u. Forstw. 3: 440.

Boerema, G.H., 1981. Bladvlekkenziekte bij andijvie en groenlof. Versl. Meded. plziektenk. Dienst Wageningen 157 (Jaarb. 1980): 14-16.

Boerema, G.H. & Verhoeven, A.A., 1980. Check-list for scientific names of common parasitic fungi. Series 2d: Fungi on field crops: vegetables and cruciferous crops. Neth. J. Pl. Path. 86: 199-228.

Ellis, M.B., 1958. *Clasterosporium* and some allied Dematiaceae – Phragmosporae. I. Mycol. Pap. 70: 1-89.

Ellis, M.B., 1971. Dematiaceous Hyphomycetes. C.M.I., Kew, 608 pp.

Jong-Stemerding, M. de, 1982. Schorseneren. Dag. Ber. MarktInf. ProdSchap Groenten Fruit (Markt-Info PGF) 218: 7-9.

Kühn, J., 1855. Über das Befallen des Rapses und die Krankheit der Möhrenblätter. Hedwigia 1: 86-92.
Neergaard, P., 1945. Danish species of *Alternaria* and *Stemphylium*. E. Munksgaard. Copenhagen, 560 pp.
Rayner, R.W., 1970. A mycological colour chart. C.M.I. Kew & Br. mycol. Soc.
Ritzema Bos, J., 1904. Eene nieuwe ziekte der Schorzoneeren. Tijdschr. PlZiekt. 10: 125-127.
Simmons, E.G., 1967. Typification of *Alternaria, Stemphylium,* and *Ulocladium.* Mycologia 59: 67-92.
Stafleu, F.A., Demoulin, V., Greuter, W., Hiepko, P., Linczevski, I.A., McVaugh, R., Meikle, R.D., Rollins, R.C., Ross, R., Schopf, J.M. & Voss, E.G., 1978. International Code of Botanical Nomenclature adopted by the twelfth International Botanical Congress, Leningrad, July 1975. Regnum veg. 97, 457 pp.
Tcheremissinoff, N.A.,? 1936. The micromycetes most common on Tau-saghyz (Scorzonera tausaghyz Lipsch. & Bosse). Trudȳ voronezh. gos. Univ. 9: 83-97 (cf. R.A.M. 16: 406-407. 1937).
Zerova, M.Y., 1933. On the diseases of Scorzonera tau-saghyz in the Ukraine. Zh. bio.-bot. Tsȳklu, Kȳev. 1933 (7-8): 151-165.

Book review

J.H. Oudejans, 1982. Agropesticides: their management and application. A manual for instructors of pesticide distributors, storekeepers and professional applicators. U.N., Economic and Social Commission for Asia and the Pacific. Bangkok, Thailand. ISBN 974-8606-08-2. V + 205 pp. Price $ 10,—

The book is available from: The ARSAP/FADINAP Project, Economic and Social Commission for Asia and the Pacific, United Nations Building, Rajadamnern Avenue, Bangkok 2, Thailand. Bulk orders may receive discounts.