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Studies of aquatic fungi. X
Some rare species *Hyphomycetes* in North–Eastern Poland

BAZYLI CZECZUGA, MIROSŁAWA ORŁOWSKA, LUCYNA WORONOWICZ

Department of General Biology Medical Academy, Kilińskiego 1 15-230 Białystok, Poland

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In the waters (river, pond, lakes) of the north-eastern region of Poland the presence 16 rare and unknown from Poland species of the aquatic *Hyphomycetes* was noted.

The abundance and variety of water bodies in the north-eastern region of Poland provide favourable conditions for the development of aquatic mycoflora. The variety of aquatic ecological niches in this area have been favourable to the vegetation of, among others, comparatively rare species of aquatic fungi. It is only in this region of Poland that of *Sommerstorffia spinosa* hase been recorded (Czeczuga, Próba 1980) and other fungi unknown in Poland were found (Czeczuga, Próba 1987; Czeczuga et al. 1984/85, 1986, 1987).

MATERIALS AND METHODS

Samples of water were collected on the shoreline of the reservoires once a year (1985-1987) for hydrochemical analysis and studies of the fungus content. In addition to water from the bed, these samples contained wood, stones and fallen leaves.

At a depth of 0.3 m at which the bucket was immersed. The water temperature was measured and pH, CO_2, oxydability, alkalinity in $CaCo_3$, the hardness of the water calculated in Ca and Mg, amonium, organic nitrogen, nitratres, phosphate, chlorides, iron, sulphates, dry residue, substances dissolved in the water and suspensions in the water were determined.

For determinations of the different chemical elements in the water standard methods (Golterman, Clymo 1969) were employed; the details of these methods are described in a previous paper (Czeczuga, Próba 1980).

The aquatic fungi were studied by a method based on direct microscopic examination of materials collected from the water as well as the bait method (onion skin, hemp-seeds and clover-seeds) applied in environmental studies and in the laboratory. These methods are described in detail in our previous paper (Czeczuga et al. 1986). Moreover, the foam collected from the surface of eddies in running water or at the edges of stagnant water was examined directly under a microscope.

RESULTS

Sixteen species of rare and unknown from Poland aquatic *Hyphomycetes* were found in the waters of the north-eastern region of Poland: 1 species in the pond, 5 species in the lakes and 10 species in the river Supraśl.

Anguillospora curvula Iqbal. The water samples in which the fungus was noted were collected in April 1986 from Lake Śniardwy at Okartowo and then kept in the laboratory with baits (onion skin and hemp seeds) for six weeks. Lake Śniardwy, area 10.599 ha, is the largest lake in the whole of Poland (17 × 13 km; maximal depth of 25.0 m). Since the lake is so a large and at the same time comparatively shallow thermal-oxygenic stratification of the lake is not observed as the result of the water being mixed by the wind in summer, there is lack of "summer stagnation". Hydrochemical analysis of the water revealed a chemical content indicative of the eutrophic character of the water (Table 1).

The mycelium was colourless, and branched with transverse septa. The conidiophores were also colourles; they were straight, 64 × 1.8 - 2.5 μm, with transverse septa. The conidia were either sickle or sigma shaped with mean dimensions of 145 × 3.25 μm. From the middle they gradually narrowed. They also had transverse septa (Fig. 1a).

Iqbal (1972) reported finding *Anquillospora curvula* in running water on decaying grass blades and *Juncus effusus*. The site described here is the second site of this fungus in the world and the first site at which this fungus has been found in stagnant water. Hydrochemical analysis of the water from this site revealed a higher content of chlorides, ammonia nitrogen, nitrites, phosphate, dry residue and substances dissolved in the water. It is interesting that the fungus occurs sporadically at this site. We had been taking samples from this site repeatedly ever since 1984. In all probability, it was only in April 1986 that the prevailing conditions were conducive to the growth of this fungus species.

Calcarispora hiemalis Marvanová et Marvan – was isolated from the

Table 1

Chemical composition of the water of some reservoirs (in mg l^{-1})

Specification	Lake Śniardwy April 28, 1986	Pond Kowale May 17, 1985	Lake Hańcza November 7, 1985	Lake Bełdany		Lake Gorbacz April 16, 1986	Lake Oleckie Duże May 21, 1985
				April 23, 1986	October 29, 1986		
Temperature, °C	5.4	20.5	4.5	7.0	8.9	9.8	5.5
pH	7.7	8.4	8.0	8.5	8.3	7.6	7.7
Oxydability	8.0	6.7	5.3	6.6	6.8	20.8	7.4
O_2	14.6	19.0	24.6	15.3	22.0	12.5	13.5
BOD_5	6.6	7.2			11.2		
CO_2	6.6	0.0	15.4	0.0	4.4	6.6	8.8
Alkalinity*	3.8	2.4	2.5	3.0	2.9	0.9	2.7
N/NH_4	0.67	0.19	0.0	0.05	0.1	1.53	0.35
N/NO_3	0.0	0.0	0.02	0.05	0.0	0.14	0.54
N/NO_2	0.0048	0.0	0.002	0.008	0.004	0.0	0.025
P/PO_4	1.19	0.21	0.0	0.89	0.3	0.32	0.77
Cl	39.0	12.0	6.0	21.0	19.0	35.0	12.0
Total hardness in Ca	54.0	33.12	23.04	46.80	33.12	20.16	41.76
Total hardness in Mg	15.9	10.32	13.76	10.32	16.77	3.44	10.32
S/SO_4	25.51	23.86	7.82	22.63	13.99	3.29	25.51
Dry residue	322	222	185	220	198	171	272
Dissolved solids	234	164	182	197	187	110	251
Suspended solids	88	58	3	23	11	61	21
Fe	0.15	0.0	0.0	0.55	0.0	0.0	0.09
Mn			0.0				

* – in mval l^{-1}

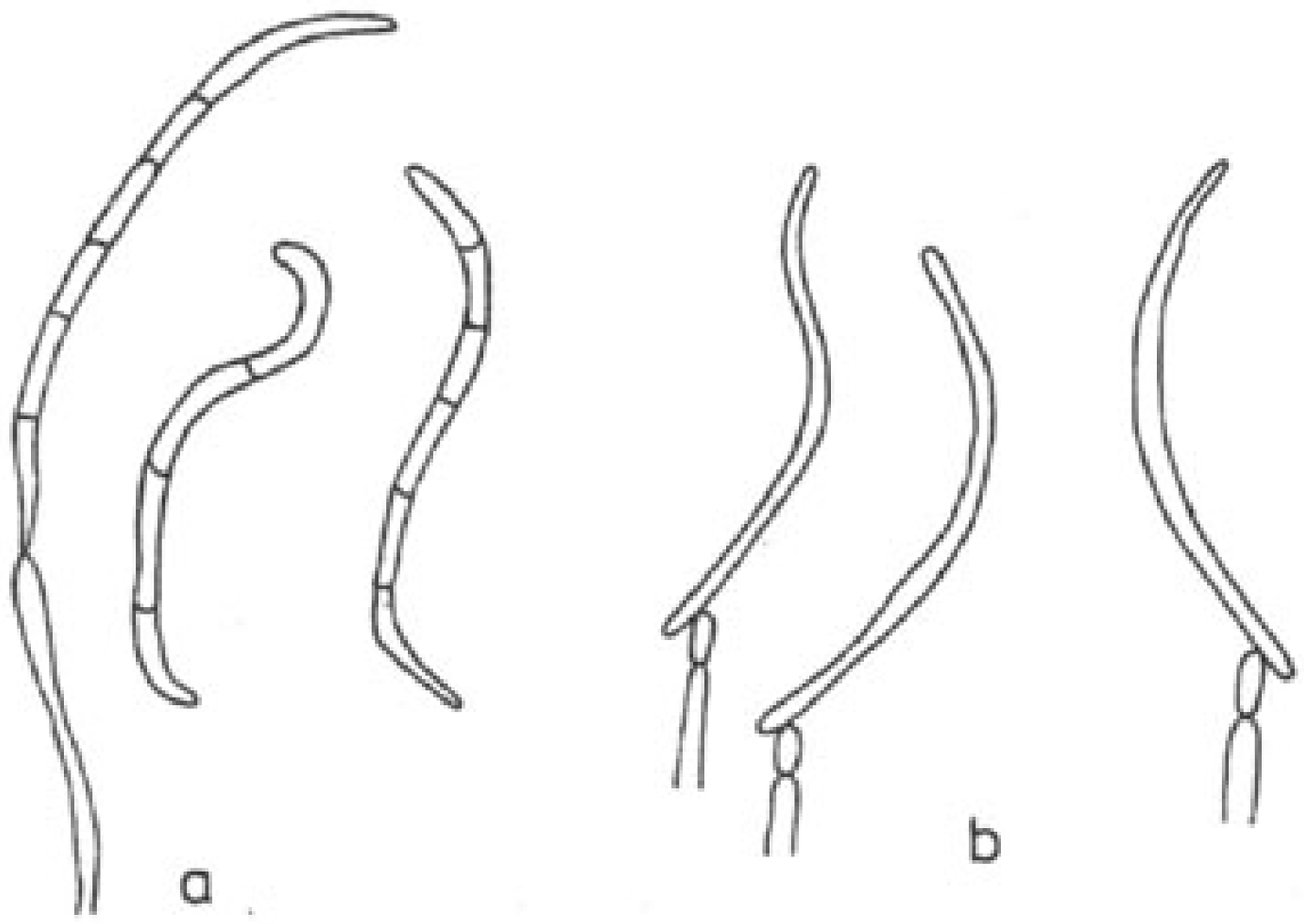

Fig. 1. *Anguillospora curvula* (a); *Calcarispora hiemalis* (*b*)
conidiophores with conidia and conidia

River Supraśl in Supraśl town in July 1987. The River Supraśl is a right-bank tributary of the River Narew. It is approximately 106.4 km long. In the locality Supraśl the river is quite wide approximately 17 - 23 m with a depth reaching to about 0.95 m. It is surrounded by meadows. The hydrochemical analysis of the water at this site in other months of 1987 is presented in Table 2. The pH of the water varied between 7.4 and 8.3, oxygen consumption varied from 2.9 to 8.4 mg O_2 l^{-1}. Ammonia nitrogen content varied between 0.0 and 1.50 mg l^{-1}. Small amounts of nitrites and nitrates were noted. The phosphate content ranged from 0.06 to 1.92 mg l^{-1}. The contents of other components were also low: chlorides from 14.0 to 26.0 mg l^{-1}, calcium from 43.2 to 64.1 mg l^{-1}, magnesium from 11.81 to 20.64 mg l^{-1}, sulphates from 18.102 to 31.68 mg l^{-1} and iron from 0.0 to 0.55 mg l^{-1}. The water of the River Supraśl in this locality is but litle polluted.

The colourless conidiophores, 31 - 43 × 1.1 - 2.1 μm in dimension, widened towards the top to 3 - 4.3 μm. The threadlike, falcate or sigmoidally bent conidia, 109 - 182 × 2.0 - 3.6 μm in dimension, have rounded tops (Fig. 1 b).

The fungus was described by Marvanová and Marvan (1963). It was found on dead *Fagus sylvatica* leaves in the waters if Czechoslovakia. Later, Dudka (1974) reported the presence of this fungus on decaying leaves and in the foam of some streams in the Ukraine. The water of the River Supraśl is now the third site at which this fungus has been found.

Clavariopsis brachycladia Tubaki was isolated in March and April from the water at the same site on the River Supraśl as the above species. The mycelium is either colourless or light olive green. The conidiophores are straight whereas the conidia are tetraradial with a main axis measuring 14 - 28 × 3.4 μm at the base, 14 - 20 μm at the top, with one transverse septum and three lateral branches measuring 6 - 11 × 7 μm (Fig. 2 a).

Table 2

Chemical composition of the water of the Supraśl River (1987) (in mg l^{-1})

Specification	January 28	March 25	April 28	May 29	June 30	July 28	August 31	September 29	October 27	November 27	December 29
Temperature C°	0.0	2.0	6.5	15.2	19.0	19.4	14.1	10.3	5.4	6.0	2.0
pH	7.4	8.0	8.1	8.3	8.15	8.1	8.0	7.7	7.9	7.7	7.6
Oxydability	5.5	6.1	8.4	3.8	6.7	6.2	2.9	5.3	4.2	4.9	4.7
CO_2	4.4	11.0	6.6	6.6	8.8	6.6	15.4	13.2	11.0	11.0	12.1
Alkalinity*	4.0	3.5	3.5	3.7	3.8	3.9	4.2	3.8	3.8	3.9	3.8
N/NH_4	0.36	0.61	1.50	1.24	0.39	0.10	0.0	0.05	0.09	0.65	0.21
N/NO_3	0.10	0.0	0.22	0.03	0.0	0.0	0.0	0.36	0.0	0.0	0.05
N/NO_2	0.010	0.0032	0.0014	0.0208	0.0182	0.0064	0.0030	0.0080	0.0130	0.0080	0.0140
P/PO	0.52	0.06	0.595	0.595	0.55	0.43	0.31	1.92	2.80	3.53	2.90
Cl^{-4}	16.0	19.0	18.0	24.0	19.0	21.0	23.0	26.0	23.0	23.0	14.0
Total hardness in Ca	72.76	55.44	43.20	59.04	57.60	58.32	58.32	64.08	62.64	59.76	62.64
Total hardness in Mg	12.90	13.76	20.64	13.76	13.76	13.76	14.19	12.47	11.81	17.63	15.48
S/SO_4	25.510	25.507	31.680	27.975	18.102	23.038	25.507	26.741	19.336	23.038	28.798
Dry residue	306	255	326	370	524	262	296	296	279	280	290
Dissolved solids	302	297	300	303	428	231	297	289	267	276	279
Suspended solids	4	42	26	67	96	31	17	7	12	4	11
Fe	0.25	0.30	0.45	0.30	0.40	0.30	0.0	0.55	0.40	0.15	0.50

* – in mval l^{-1}

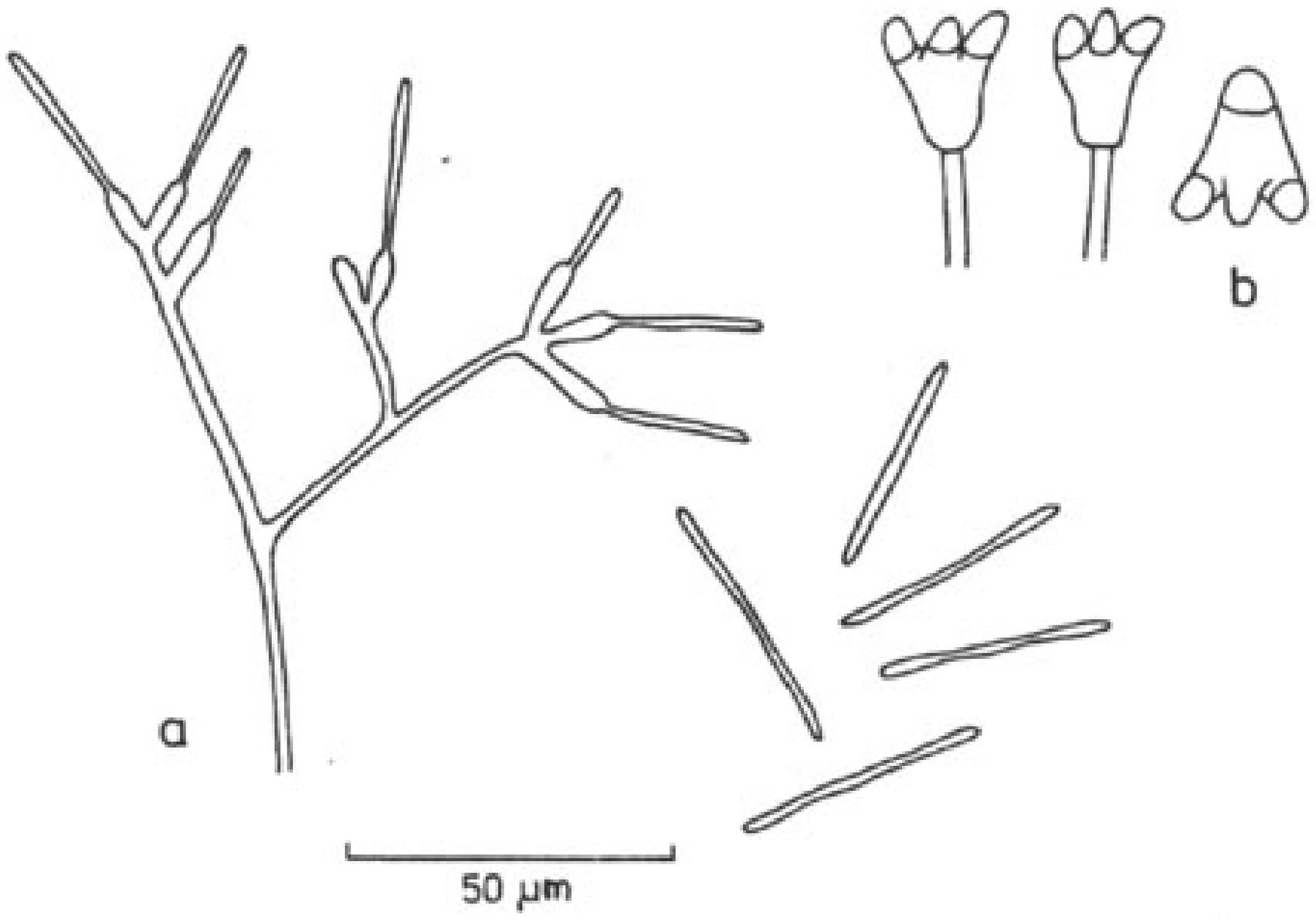

Fig. 2. *Clavariopsis brachycladia* (*a*); *Flagellospora stricta* (*b*)
conidiophores with conidia and conidia

This fungus was first isolated from *Acer* sp. leaves decaying in water in Japan (Tubaki 1958; Nimura, Suzuki 1962). It has also been reported from Germany and France (Casper 1966) and in the Soviet Union (Arnold 1969).

Flagellospora stricta S. Nilss. was found in May 1985 in water collected from the littoral zone of Kowale Pond (10.0 ha, max. depth 1.1 m) in the fish farm of Poryta Jabłoń in surroudings where alder trees grow. The water was kept in the laboratory. Chemical analysis of the water of the pond revealed that the pH was slightly alkaline, the organic matter was comparatively low but the dissolved oxygen content was high. The water of the pond was rich in calcium but poor in iron. The content of nitrogen compounds was low but the level of phosphates high (Table 1). The isolated mycelium of this fungus was colourless and ramified with septa. The conidiophores were also colourless and ramified, having on their upper furcations numerous mace-shaped phialides. The conidia were either rod-shaped or thread-like, straight, also colourless, 28 - 43 × 1.0 - 1.6 µm, without septa, narrow slightly on ends (Fig. 2 b).

Ingold (1944) in his studies of *Fungi Imperfecti* on submerged alder leaves described a new genus of *Flagellospora* with two species, *F. curvula* and *F. penicillioides*. Nilsson (1962) while studying the mycoflora in streams in Sweden discovered a third species of this genus and named it *F. stricta*.

Nilsson (1962) and Osipjan and Ajrapetijan (1979) found *F. stricta* on decomposing leaves in running waters whereas in our investigations we

have found the fungus in a different site and a different environment, that is stagnant water since ponds are classified as such.

Geniculospora grandis Greathead ex Nolan (*Hymenoscyphus africanus* Desc. Fisher, Webster) was found in November 1985 in water collected from the shore of Lake Hańcza where the River Czarna Hańcza into the lake in its upper coure. The Lake Hańcza (296.3 ha, max. depth 108.5 m) is situated in the Suwałki Lake District on the border of the Suwałki Landscape Park. It is a tunnel-valley lake. It possesses typical characteristics of an oligotrophic lake having an oxygen maximum in the thermocline (Czeczuga, Grądzki 1970). The present studies (Table 1) conducted by generally accepted methods, showed that the lake is the least polluted of all the lakes in the Suwałki Landscape Park.

After keeping the sample of water (bait-hemp seeds) for some time in the laboratory, the development of this fungus was noted. The colourless conidia were tetraradial with what appeared to be the main cylindrical axis (64-85 × 5-8) μm somewhat bent. Each arm of this slightly bent cylinder (53-98 × 8-10 μm) had from 3-7 transverse septa. At the site of its slight bend the main cylindrically-shaped arm gives off two lateral branches, also possessing 3-7 transverse septa. The conidia were also colourless (Fig. 3).

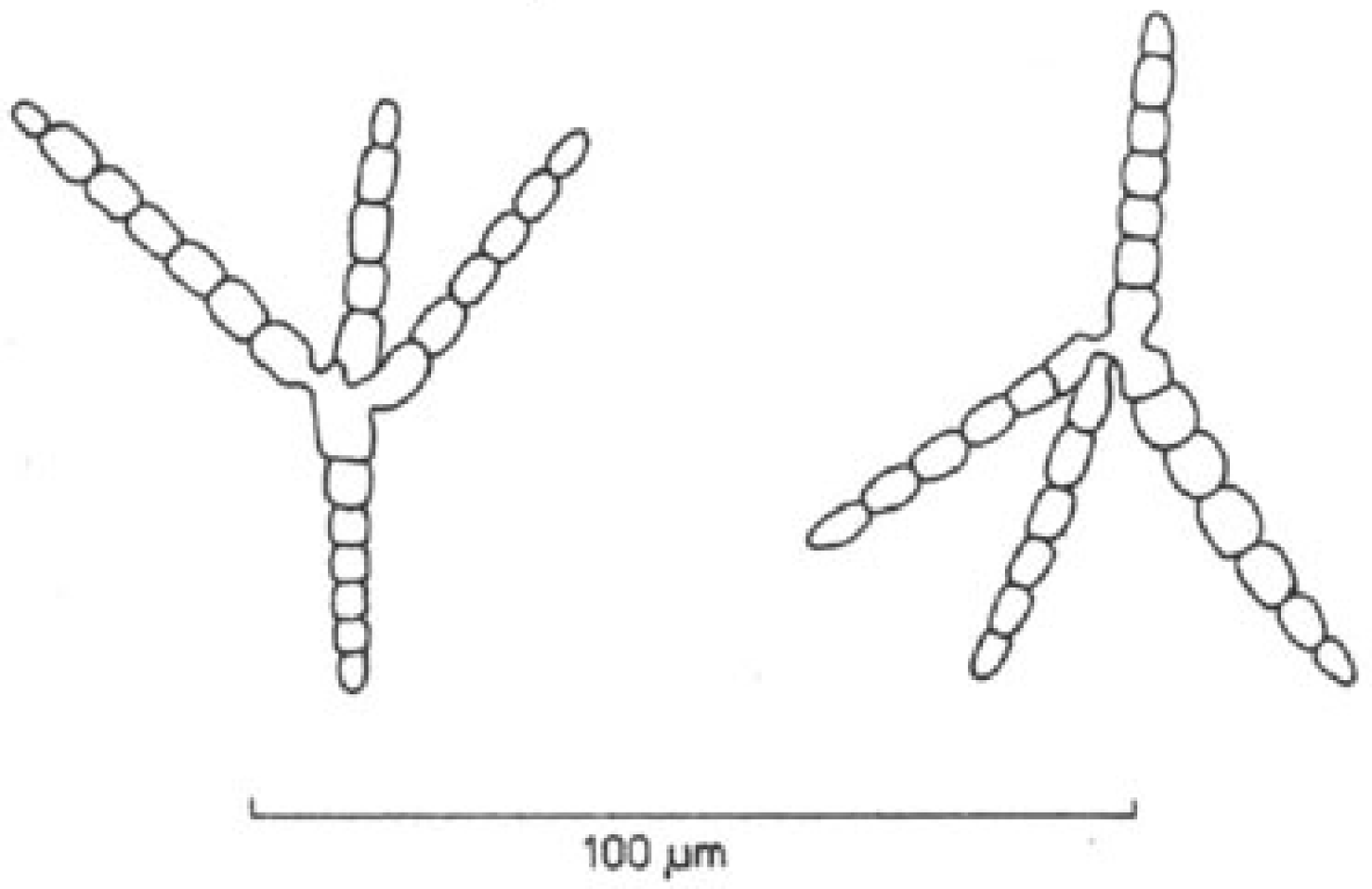

Fig. 3. *Geniculospora grandis* conidia

The site at Lake Hańcza is the third side in the world at which *Geniculospora grandis* has been found. In this case, the site differs in character from the two previously reported. The site in South Africa described by Greated (1961) was a small stream and that reported by Milko (1965) was a larger body of water (river Danube) with a muddy bed on which *Phragmites communis* grew. The fungus was found on the leaves of these plants in the water. Descals et al. (1984) reported this fungus in the waters of Malaya.

Geniculospora intermedia (Peters.) S. Nilss. ex Marv. et. S. Nilss. This fungus was found in the foam of the River Supraśl in June. The colourles mycelium is branched with septa. The conidiophores straight, 54 - 98 × 4 - 4.2 μm in dimension, are also colourless. The conidia are tetraradial with the main axis bent in the central section (154 - 200 × 3.8 - 4.1 μm) and have two lateral branches (86 - 112 × 3.8 - 4.1 μm) (Fig. 4 a).

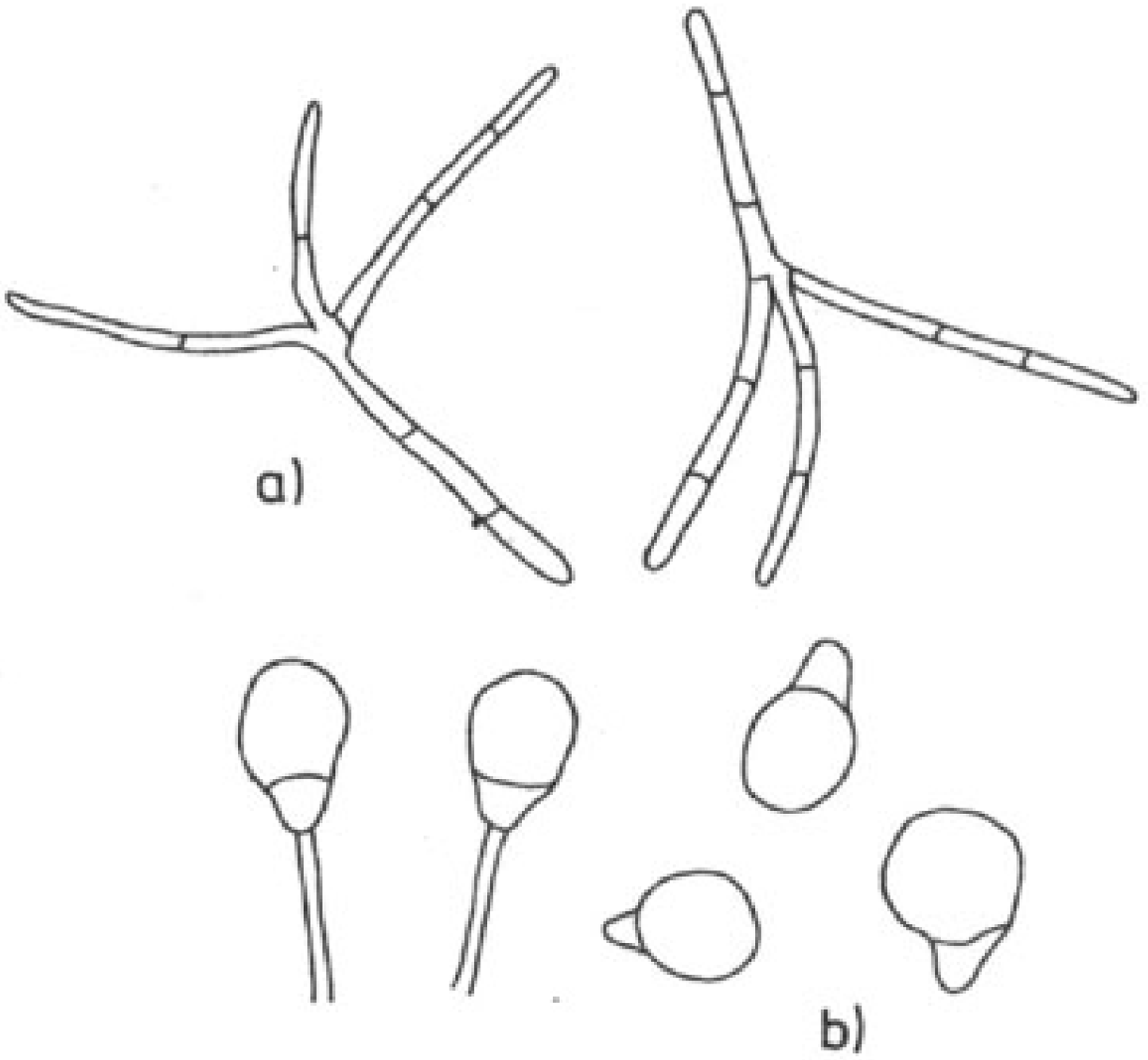

Fig. 4. *Geniculospora intermedia* (*a*); *Monotosporella microaquatica* (*b*)
a – conidia; *b* – conidiophores with conidia and conidia

As regards the *Geniculospora intermedia*, this fungus was first isolated by Petersen (1962) in the USA from branches decaying under water and then, again in the USA, by Crane (1968). It has also been found in Sweden (Nilsson 1964), in East Germany (Arnold 1970), and in the foam of several streams in the Ukraine (Dudka 1974).

Monotosporella microaquatica (Tubaki) S. Nilss. (Syn.: *Dactylella microaquatica* Tubaki, *Monosporella microaquatica* (Tubaki) Petersen) isolated in September, October and December from the foam of the River Supraśl. The mycelium is branched with septa, colourless. The conidiophores are straight, colourless, measuring 28 - 64 × 3.2 - 4 μm. The conidia 10 - 14 × 4.2 - 7.8 μm are oval (Fig. 4 b).

This fungus was first found in the waters of Japan (Tubaki 1957). It was also encountered in Sweden (Nilsson 1962), in the USA (Petersen 1962), in the USSR (Dudka 1963), in the GDR (Casper 1965) and in Cuba (Marvanová, Marvan 1969).

Mycocentrospora aquatica (Iqbal) Iqbal was found in water samples collected from Lake Bełdany at Wygryny in 1986 was kept with bait (onion skin) in the laboratory for approximately one and a half months. Lake Bełdany (940.6 ha, max. depth 46.0 m) is situated in the Masurian Lake District in what is termed the complex of Great Masurian Lakes and is of tunnel-valley type. As chemical analysis of the water from this site showed, it was characterized in both spring and autumn of 1986 by a low oxygen consumption (6.6 - 6.8 mg l^{-1}) a low carbon dioxide content (0.6 - 4.4 mg l^{-1}) and a large amount of dissolved oxygen (22.0 mg l^{-1}) and nitrites 0.004 - 0.008 mg l^{-1} (Table 1). Furthermore, in both spring and autumn, small amounts of ammonia and phosphates were present. A fact worthy of note is that most of the parameters values of the water in 1986 were higher in April than in October.

The mycelia of the fungus were light-brown in colour, branched with transverse septa. The conidiophores were colourless usually, single but sometimes slighty branched. The conidia are creacent-shaped slightly narrowed and bent towards the tip. Their mean dimensions were 102 × 2.7 μm. They were colourless with 3 - 12 transverse septa. At the base of some of the conidia, a small sword-shaped process growing out sideways could be seen (Fig. 5).

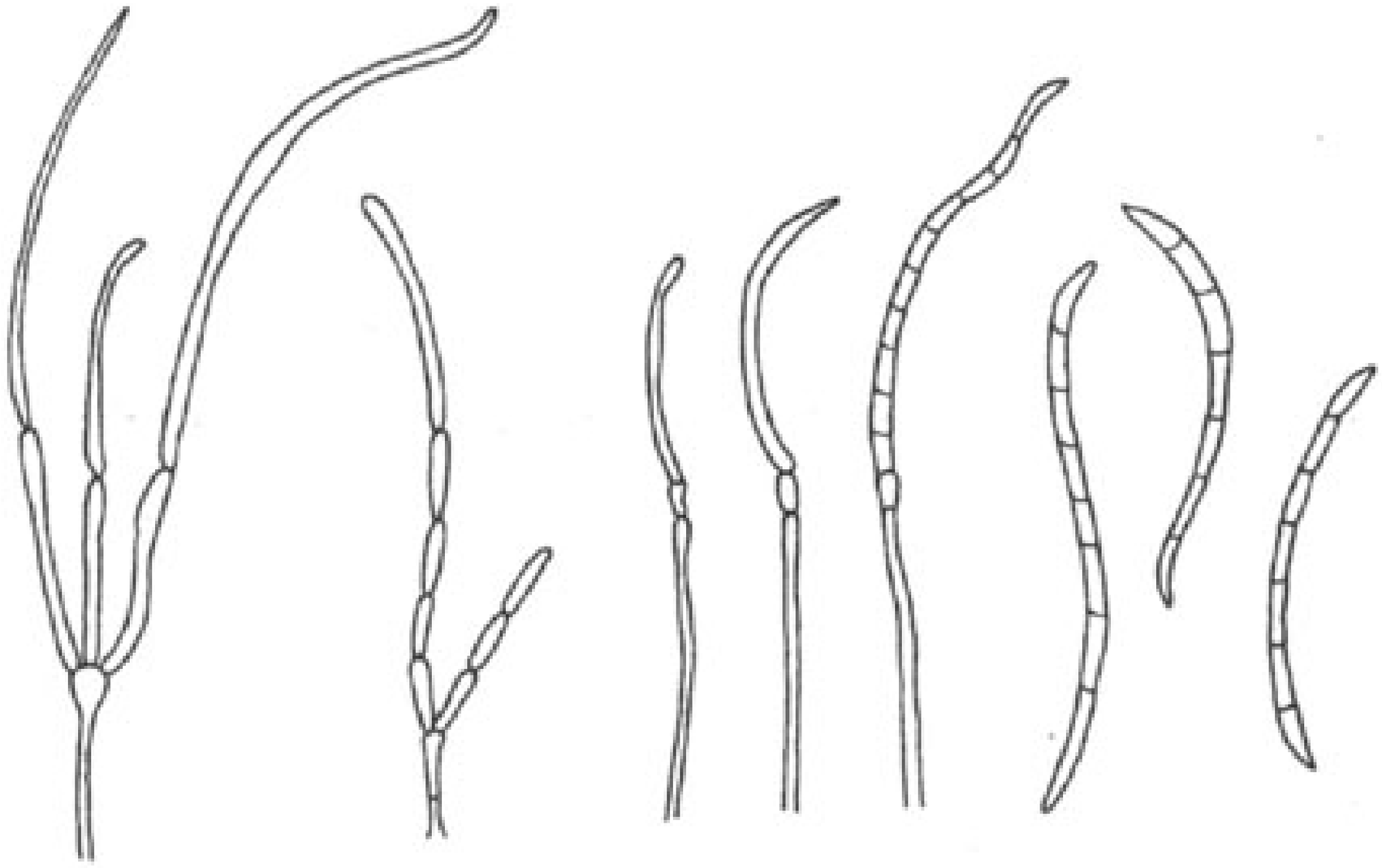

Fig. 5. *Mycocentrospora aquatica*
conidiophores with conidia and conidia

As known, Iqbal (1971) first reported finding *Mycocentrospora aquatica* on decaying branches in a stream. He classified it as *Centrospora aquatica* but later assigned it to the *Mycocentrospora* genus (Iqbal 1974).

Kirgizbaewa and Sahdullaeva (1977) found *Mycocentrospora aquatica* on shreds of plants in an irrigation canal whilst studying the microflora of irrigation canals in the desert region of Uzbekistan. A few years later,

Osipjan and Ajrapetijan (1979) reported a new site of this fungus in Armenia where it was found on decaying oak leaves in the River Bldančaj. All these sites of *Mycocentrospora aquatica* were in running water, whereas the new site reported in the present paper is in stagnant water so that this is the first report of the fungus occurring in such water.

Polycladium equiseti Ing. was found in the foam of the River Supraśl in August and September. The mycelium is colourless, branched with transverse septa (Fig. 6 a). The conidiophores are straight, colourles, 204 - 388 × 4 - 5 μm in dimension, with septa. The conidia are branched with a main axis (200 - 396 × 3-4 μm.

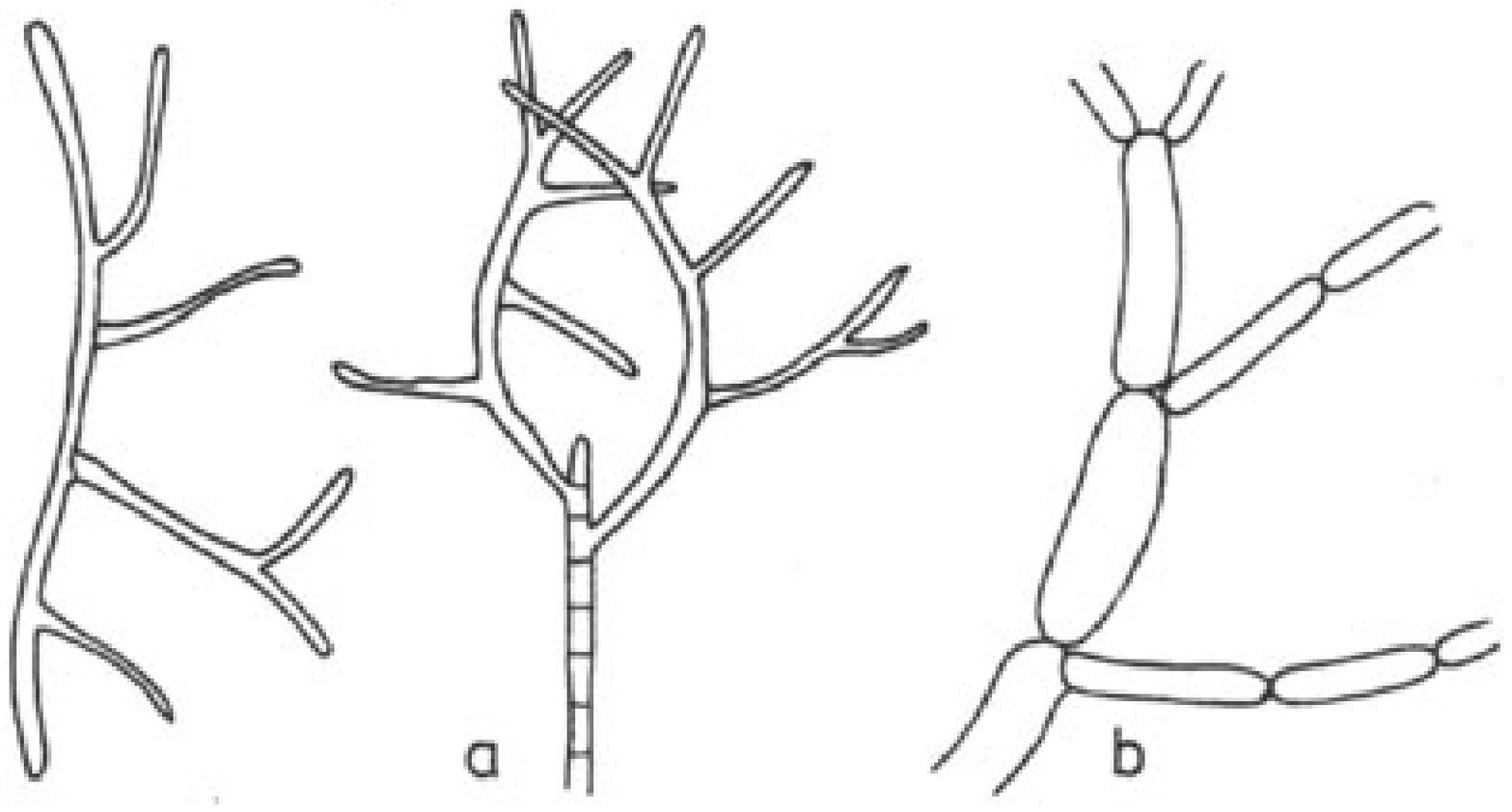

Fig. 6. *Polycladium equiseti* (*a*); *Saprochaete saccharophila* (*b*)
a – conidiophore with conidia and conidium; *b* – form of ramification of the mycelium

The fungus was isolated from the internodes of *Equisetum fluviatile* decomposing in water in Great Britain (Ingold 1959). It has also been found in Sweden (Nilsson 1964), in England (Jones 1965) and in the USSR (Arnold 1969).

Saprochaete saccharophila Coker et Shanor. Isolated from the water samples collected in November from the River Supraśl. This profusely branched fungus is several centimetres in length. The end branches consist of narrow cells (4.8 - 10.2 μm in width) containing numerous vacuoles. The axial blade-like cell measures 168 × 30 μm (Fig. 6 b).

Saprochaete saccharophila was discovered by Coker and Shanor (1939) in a stream in the USA and many years later their findings were confirmed at the same site by Wagner, Dawes (1970). It has also been found in West Germany (Wagner, Daves 1970). It has also been found in West Germany (Wagner, Dawes 1970), and in Czechoslovakia (Häuslerová 1972).

Sigmoidea prolifera (Petersen) Crane. (Syn.: *Flagellospora prolifera* Petersen). Isolated from the water of the River Supraśl in January. The mycelium

is branched with septa. The conidia are colourless, falcate or sigmoidal in shape 46 - 110 × 1.4 - 2.6 μm in dimension (Fig. 7 a).

Sigmoidea prolifera was isolated from plant remains decaying in water in the USA (Petersen 1963 b) and then in another small water body in the same country by Crane (1968). In Europe, it has been found in a stream in the Ukraine (Dudka 1974) and in the present investigations in the River Supraśl, so that this is the second site of this fungus, in Europe.

Speiropsis irregularis Petersen was isolated from the water and foam of the River Supraśl in September and December. The mycelium is brown and branched with transverse septa. The conidia are also characteristically branched (Fig. 7 b).

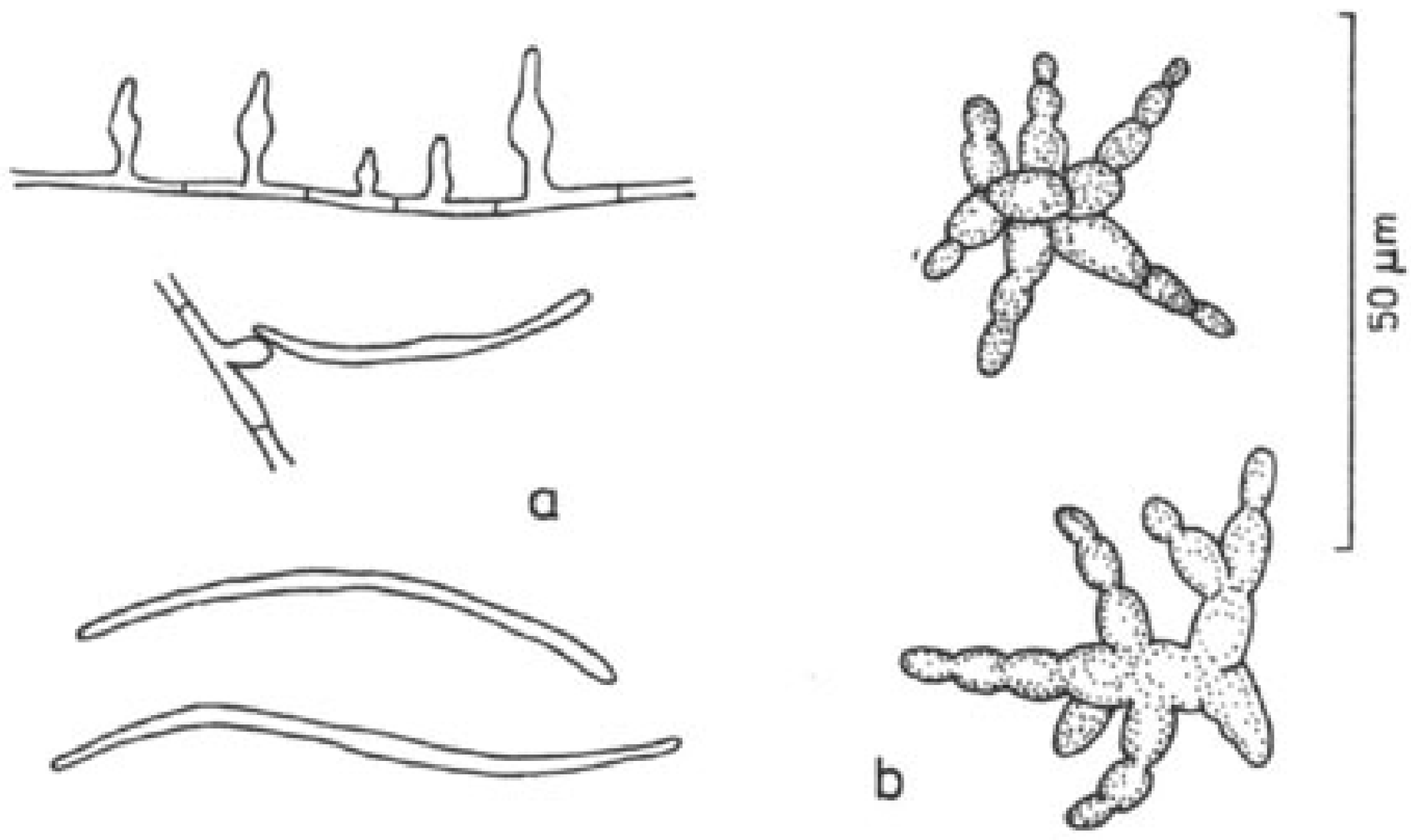

Fig. 7. *Sigmoidea prolifera* (*a*); *Speiropsis irregularis* (*b*) conidia

Petersen (1963 a) described *Speiropsis irregularis* on decaying oak leaves in water in the USA. It has also been noted in the waters of the Ukraine (Dudka 1970). Poland is therefore the third country in which this fungus has been found.

Tricladium attenuatum Iqbal was founded in June and July in the water and foam of the River Supraśl. The mycelium is colourless and branched with transverse septa (Fig. 8 a). The conidiophores are colourless, either straight or branched and 28 - 72 × 1.4 - 2.4 μm in dimension. The conidia are tetraradial with tapered ends, 4 - 8 transverse septa and 2 lateral branches. The main axis measurels 38 - 68 × 2.6 μm.

The River Supraśl is the third site from which *Tricladium attenuatum* has been reported. Iqbal (1971) first isolated it from the leaves of *Crategous monogyna* decaying in water in Great Britain. It was leter discovered by Dudka (1974) in the foam of a Ukrainian stream.

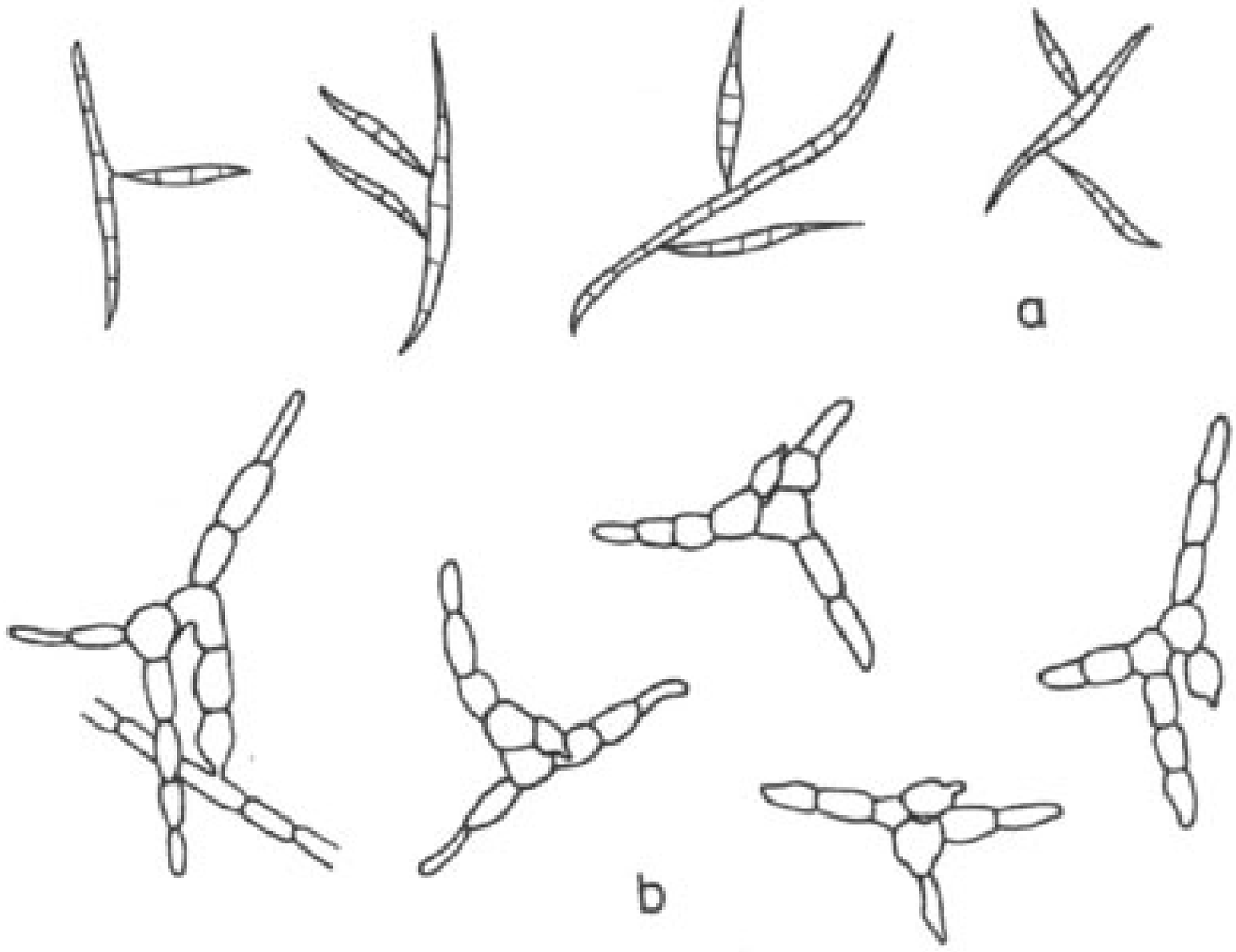

Fig. 8. *Tricladium attenuatum* (*a*); *Tripospermum camelopardus* (*b*) conidia

Tripospermum camelopardus Ing., Dann et McDougall. Isolated from the water of the Lake Gorbacz (April) and River Supraśl (May 1987). Lake Gorbacz (48.5 ha, max. depth 1.2 m) is a pond-like lake with a bed 5.5 m deep which has an upper layer of muddy gittia (Czeczuga 1973). The water of the lake is light brown in colour, indicating the presence of considerable amounts of humus compounds. The samples for the tests for the presence of aquatic fungi were taken from 4 sites over several years. *Tripospermum camelopardus* was found at only one site (in the northern part of the lake) in September 1986 in the littoral zone. At this place, the shore of the lake was covered with a growth of osier while reed-mace and water-lily grew in the water. Lake Gorbacz is of the pond-dystrophic type, surrounded on all sides by peat-bogs covered with a growth of mainly birch and osier and, to a lesser extent, alder. There are no streams or river flowing into the lake nor is there any type of outflown. It should be noted that the oxygen consumption is for a lake relatively high reaching 20.8 mg l^{-1} and that the ammonia content is substantial (1.53 mg l^{-1}). As for a lake, only small amounts of magnesium (3.44 mg l^{-1}), sulphates (3.291 mg l^{-1}) and a small amount of dry residue (171 mg l^{-1}) were noted. The light brown colour of the lake indicates that it is of humus type. Lake Gorbacz is the only lake in the Knyszyn – Białystok Forest. The mycelia and conidia of *Tripospermum camelopardus* were noted in water collected in April 1986 from the site described above and them kept in the laboratory for about one and a half months in a one-litre jar with bait (hemp and clover seeds).

The mycelium was grey in colour, branched with transverse septa. The

conidia, tetraradial in shape, formed directly on the mycelium and possessed a main axis with two lateral branches (Fig. 8 b). The main axis is bent in the middle at an acute angle and 4-5 transverse septa could be seen. The proximal part of the axis was slightly widened (14-20 × 5 μm) whereas its distal part was slightly norrowed (24-39 × 3-4 μm). The lateral branches grew out from both the proximal part of the main axis (14-34 × 3 μm, with 1-2 internal septa) and the distal part (9-19 × 3 μm, unicellular or with 1-2 transverse septa). The conidia were sometimes grey but generally they were colourless.

The *Tripospermum camelopardus* was first found in a small river near Lake Windermere, England (Ingold et al. 1968). It is now known to occur in rivers in the Ukraine (Dudka 1973), in Georgia, USSR (Dudka 1984) and in Switzerland (Wawrik 1984).

Tripospermum camelopardus had, to date, been found only in running water, usually small rivers and streams. Our studies revealed for the first time that this fungus occurs in a lake, that is, in stagnant water.

Tripospermum myrtii (Lund.) Hughes. In water collected from the shore of Lake Oleckie Duże in May 1985 and then kept in our laboratory the presence of *Tripospermum myrtii* was established. Lake Oleckie Duże (276.3 ha, max. depth 48.5 m) is located in the eastern part of the Masurian Lake District. Samples of water were collected for hydrochemical analysis in May, from the part of the lake which borders on Olecko town. The analysis revealed markedly increased in leaves all forms of mitrogen, phosphates and oxygen consumption. The following values were noted: N – NH_4^+ – 0.35 mg l^{-1}, N – NO_2^- – 0.025 mg l^{-1}, N – NO_3^- – 0.54 mg l^{-1}, P – PO_4 – 0.77 mg l^{-1}, oxygen consumption – 7.4 mg l^{-1}. Iron, 0.30 mg l^{-1}, and magnesium, 0,09 mg l^{-1} were also found. The water of the lake also had a higher mineralization. This is also characteristic of other Polish lakes situated in or near towns which usually dispose of their wastes into the lakes.

The shreds of the mycelium were dark-grey of a slightly olive-green shade, branched with septa. No conidiophores were seen and the conidia grew out of the mycelium shreds in a pentaradial form with had a main axis (30-50 × 5-8 μm, as it were, and three branches (10-30 × 4-5 μm (Fig. 9a).

Among the species of the *Tripospermum* genus leading an epiphytic life on the leaves of various species of trees, only three have to date been described as having a water habitat. These are *Tripospermum myrtii*, *Tripospermum camelopardus* and *Tripospermum prolongatum* (Carmichael et al. 1980). *Tripospermum myrtii* was first found in the water of a stream at Lullingstone (Ingold, Cox 1957). This fungus (Ingold, Cox 1957) has been found on the leaves of trees growing over streams. It, therefore, lives in two environments. When the leaves fall, the conidia of the fungus enter an aquatic environment. The presence of this fungus in water collected in spring, and

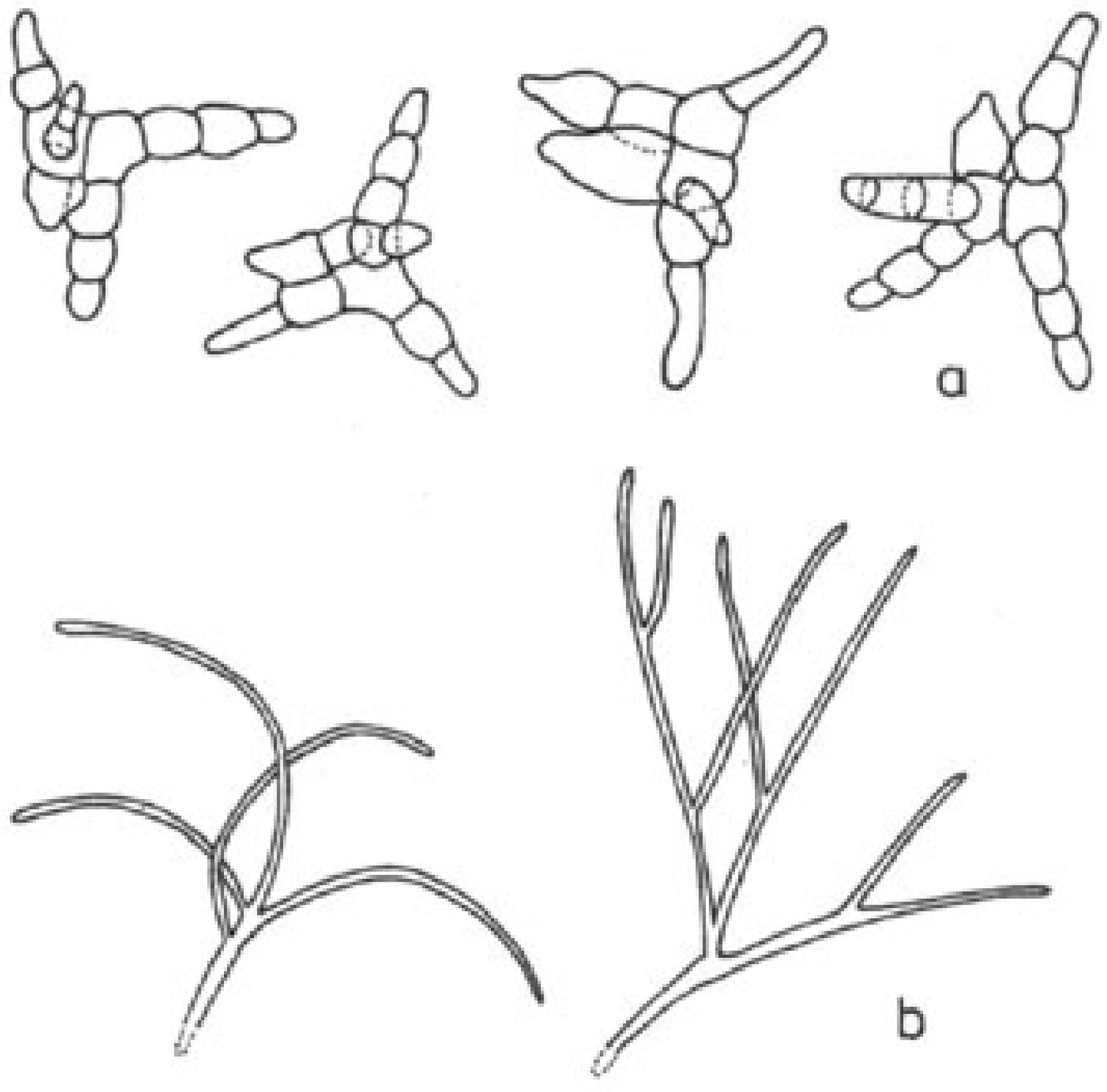

Fig. 9. *Tripospermum myrtii* (*a*); *Varicosporium delicatum* (*b*) conidia

not autumn, from a lake, as noted in these investigations may widen our knowledge of the biology of this fungus of so interesting a development.

Some workers are of the opinion that *Tripospermum myrtii* is an epiphytic fungus and that streams only serve for its propagation (Marvanová 1973). According to this author there are only two entirely aquatic species, namely, the *Tripospermum camelopardus* and the *Tripospermum prolongatum* Sincl. et Morgan-Jones (1979), which was found on decaying leaves in water. Dudka (1985), however, in his key to imperfect aquatic fungi, included a description of all three species of the *Tripospermum* genus.

Varicosporium delicatum Iqbal. Isolated from the foam of the River Supraśl in January and December. The mycelium is colourless and branched with septa. The conidiophores are straight and colourless, 152 × 1.4 - 2 μm in dimension. The conidia are profusely branched with a main axis measuring 120 - 290 × 1.6 - 2 μm (Fig. 9b).

The River Supraśl is also the third site at which the fungus *Varicosporium delicatum* has been found. It was reported for the first time by Iqbal (1971) who found it in decaying *Acer pseudoplatanus* leaves in water in Great Britain. Dudka (1974) also found it in the foam of some streams in the Ukraine.

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