

The typical variety and developmental stages of *Micrasterias truncata* (Corda) Bréb.

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Abstract

The species *Micrasterias truncata* and its developmental stages were investigated. Certain varieties distinguished within this species are critically evaluated as synonymous.

INTRODUCTION

Micrasterias truncata is a common species in the waters of transitional and high peat bogs. It is found almost over the entire vegetation period in large quantities. Its development maximum falls to the summer and autumn months.

The literature concerning this species within its entire range of occurrence lists a number of smaller taxons: *M. truncata* (Corda) Bréb. var. *bahusiensis* Wittr., var. *crenata* (Bréb.) Reinsch, var. *cristata* Roll, var. *expansa* (Turn.) Kossinsk., var. *lata* Eichl., var. *neodamensis* (A. Braun) Dick, var. *quadrata* Bulnh., var. *semiradiata* (Näg.) Cleve, var. *tridentata* Benn., var. *turgida* Taylor, var. *uralensis* W. Krieg. and others. In this country the species is found not only in its typical variety, but also in the one described as var. *crenata* which has been interpreted by some authors as a separate species — *Micrasterias crenata* Bréb. (Raciborski 1888; Eichler 1895; Gutwiński 1895; West 1905; Migula 1907, 1911; Kadłubowska 1952 and others). Only seldom have specimens of the varieties: var. *bahusiensis*, var. *lata*, var. *neodamensis*, var. *semiradiata*, var. *tridentata* been described from Poland. The most controversial opinions concern *M. truncata* var. *crenata*. In numerous papers a number of authors (West 1905; Borzecki 1919; Rypkowa 1927; Wysocka 1934; Krawiecowa 1954; Gołowiń 1964 and others) call attention to the diversity of the individuals classified

to *M. truncata* var. *truncata* and to the occurrence of numerous intermediate forms between this variety and *M. truncata* var. *crenata* (or the species *M. crenata*). Intermediate forms are also found between other varieties.

RESULTS AND OBSERVATIONS

In the course of elaboration of the desmidian flora of transitory peat bogs on the Mazowsze lowland the variability of individuals belonging to the species *M. truncata* attracted my attention. I found this species there in its typical variety — var *truncata* (Figs 1d, 2d) as well as in three other varieties. Most frequent and numerous were individuals of the typical variety and much less common those classified as var. *crenata*; specimens of the varieties var. *neodamensis* and var. *bahusiensis* were extremely rare.

Individuals of the var. *crenata* (Fig. 3g) in contrast to the typical ones have spines neither on the ends of the apical lobe nor on the lateral lobes segmented to the second order.

While elaborating the material I came upon specimens in which one half-cell represented the typical variety and the other half the variety *crenata* (Fig. 1a). There was a whole series of half-cells with intermediate shapes between the variety *crenata* and the typical one (Fig. 1b, c), this being mentioned frequently in the literature as an example of anomaly. It is not so, however. Such specimens belong to the typical variety and represent various stages of vegetative propagation.

The growth of the newly formed half-cell is very interesting and occurs in various ways. The newly formed half-cell may equal in size the maternal half-cell, without developing spines on the ends of the apical lobe and on the lateral lobes of the third order. The one half-cell of the end stage of development is typical for var. *crenata*, and the second half-cell for var. *truncata*. Finally spines develop gradually or almost simultaneously on all endings of the lobes of the half-cell characteristic for the var. *crenata*. Consequently a typical cell of the variety *truncata* is formed (Fig. 1d).

I have frequently found individuals in which one half-cell was typical for var. *neodamensis* and the other one for var. *truncata* (Fig. 2a). They also are the result of vegetative propagation where the newly formed half-cell reaches almost the size of the maternal half-cell, forms spines at the ends of the apical lobe and on the lateral lobes segmented only to the second order. Segmentation of these lobes to the third order occurs later (Fig. 2b-c), and finally we again have at the end stage of vegetative propagation a typical specimen of *M. truncata* var. *truncata*.

Beside the above described two ways of lateral lobes formation with a rather regular development, I have noted a number of half-cells in

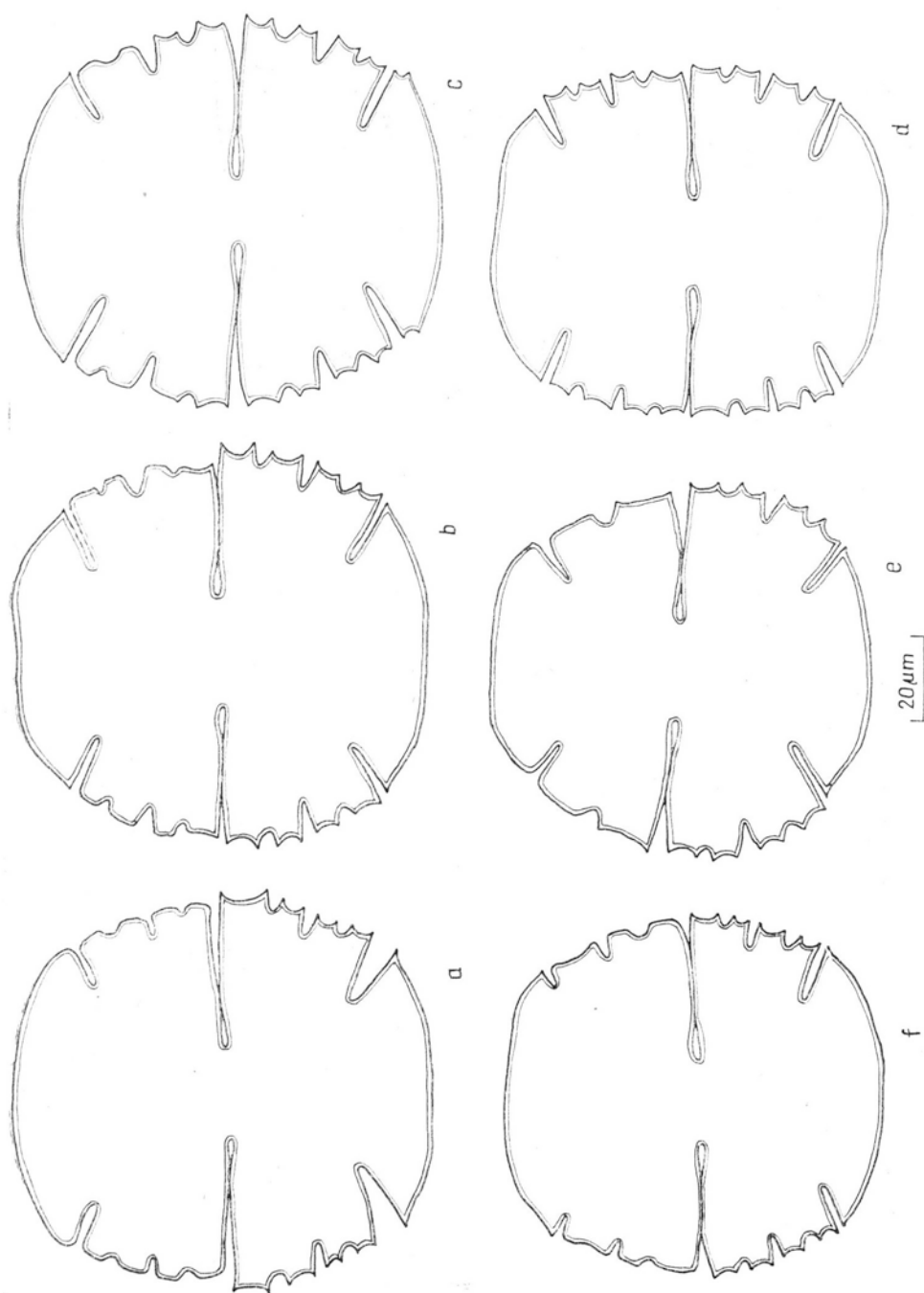


Fig. 1. Development of half-cells of *Micrasterias truncata* var. *truncata* formed by way of vegetative propagation

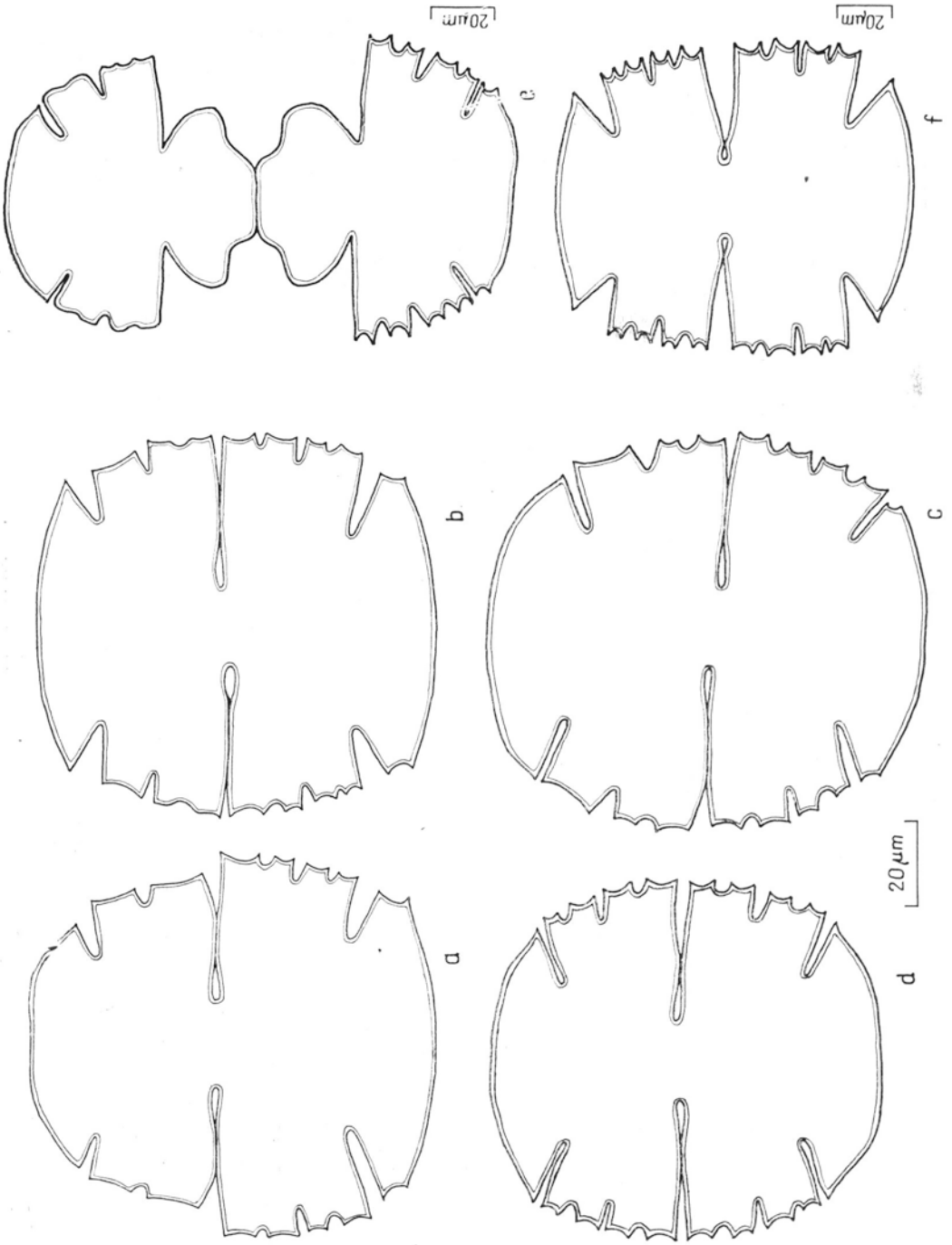


Fig. 2. Development of *Micrasterias truncata* var. *truncata* half-cells formed by way of vegetative propagation

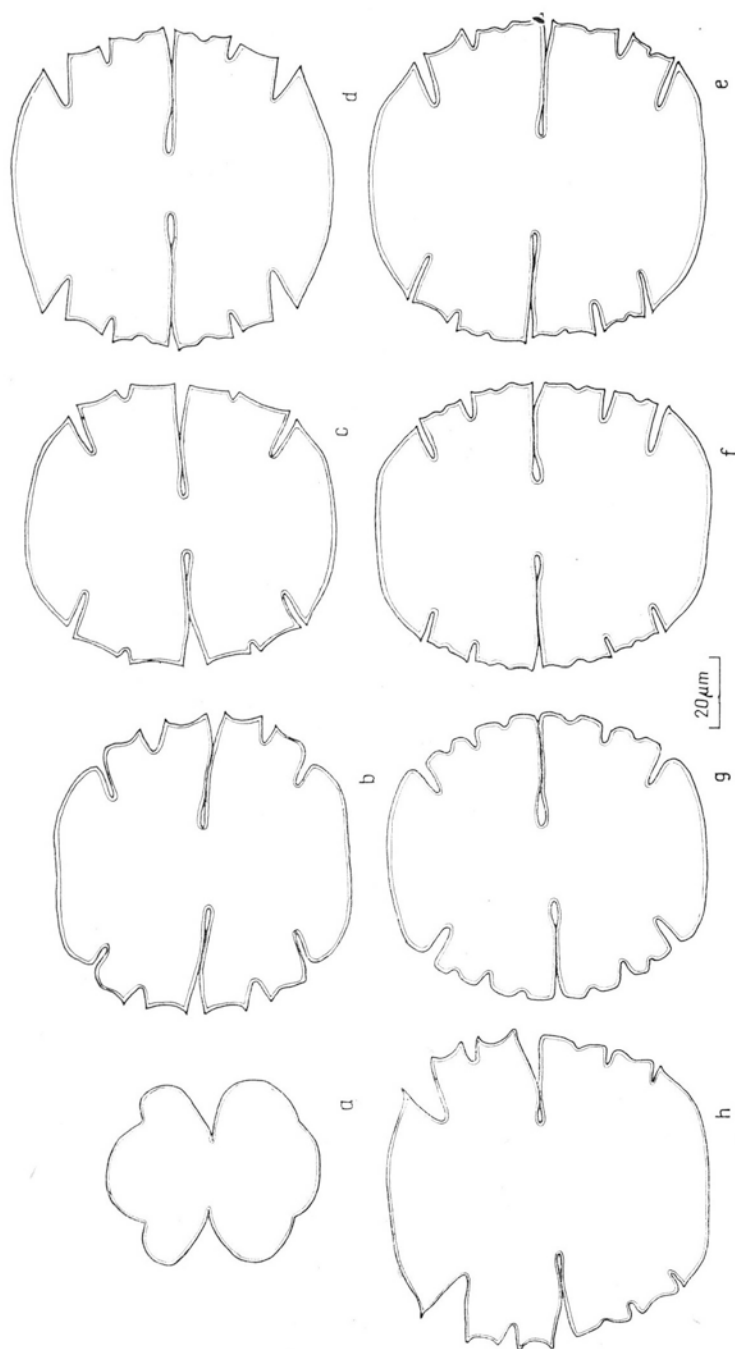


Fig. 3. Development of *Micrasterias truncata* var. *truncata* cells formed by way of generative propagation

which the lateral lobes develop rather irregularly. The apical lobe may have spines already formed when the segmentation of the lateral lobe is hardly noticeable (Fig. 1f). Individuals may be seen in which in the forming half-cells the lateral lobes are not yet completely separated, and there are no spines on the ends of the apical lobe, while at the end of the lower lateral incompletely segmented lobe spines are formed (Fig. 1e). Sometimes the developmental stages of *M. truncata* are still more varied in the individuals derived from a zygote. Individuals occur in which two half-cells are in different stages of development. The reason for this remains so far obscure (Fig. 3h).

If we compare the developmental stages of half-cells formed by way of vegetative propagation with those of individuals derived from zygotes (Fig. 3a-g), a complete similarity is observed. This seems to suggest that the varieties distinguished (var. *crenata*, var. *neodamensis*) are simply different developmental stages of *M. truncata* var. *truncata*.

In order to confirm these suppositions based on observation, the dimensions of individuals of the variety *truncata* and those described either as *M. crenata* or as *M. truncata* var. *crenata* by various authors were compared. Those papers were taken into account in which the authors described both taxons mentioning at the same time the range of variability concerning: length and breadth of cells and width of apical lobe (Fig. 4). As seen all the dimensions of the var. *truncata* are

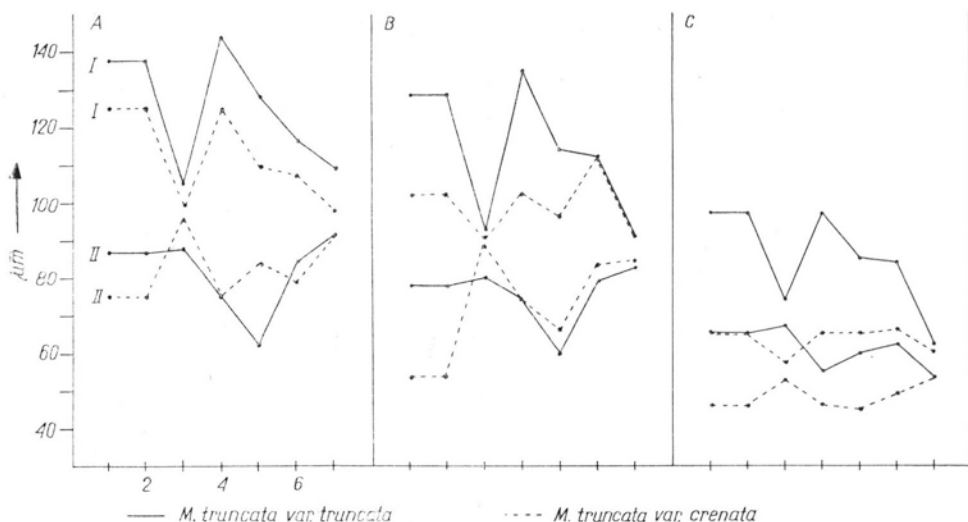


Fig. 4. Variability range of basic dimensions of *Micrasterias truncata*:

A — length; B — breadth; C — width of apical lobe, I — upper limit of dimensions; II — lower limit of dimensions. Dimensions according to: 1 — West 1905, 2 — Migula 1907; 3 — Wysocka 1934; 4 — Krieger 1939; 5 — Kossinskaja 1960; 6 — Wasyluk 1961; 7 — Tomaszewicz

always larger than those of individuals of the variety *crenata* (or *M. crenata*). This is quite natural since the individuals of *Micrasterias* in the course of development are always smaller than mature ones. It is one more argument indicating that the taxon known under the name *M. truncata* var. *crenata* (or *M. crenata*) denotes only a stage of development and is no separate taxon. The same is true as regards *M. truncata* var. *neodamensis*.

I believe that the distinguished variety *M. truncata* var. *bahusiensis* (Fig. 2f) is also a developmental stage of the typical variety in the case when its development probably occurs in some specific habitat conditions. On account of the too small material available it is as yet difficult to reach a decision concerning this variety.

Finally attention is called to another observation as far as vegetative propagation of *M. truncata* var. *truncata* is observed. Namely, in autumn I found individuals propagating vegetatively in which one half-cell was completely formed, whereas the other one was not yet fully developed (Fig. 2a). Nevertheless both underwent division producing two equal daughter half-cells.

CONCLUSIONS

1. The two taxons discussed, *M. truncata* var. *crenata* and *M. truncata* var. *neodamensis* constitute a developmental stage of *M. truncata* var. *truncata* and I consider that they should be treated as synonymous with the latter.

2. In certain conditions vegetative propagation of *M. truncata* var. *truncata* may occur before both its half-cells reach full morphological maturity.

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REFERENCES

- Borzecki K., 1919, Przyczynek do znajomości Desmidiów okolic Lwowa, Rozpr. Wydz. Mat.-Przyr. P.A.U., III, 19 B: 1-41.
- Eichler B., 1895, Materyały do flory wodorostów okolic Międzyrzecza, Pam. Fizj., 13.
- Gołowin S., 1964, Glony torfowiska Chlebowo (pow. Oborniki, woj. poznańskie), Fragm. Flor. et Geobot. 10, 1:121-169.
- Gutwiński R., 1895, Prodrum florae algarum galiciensis, Rozpr. Wydz. Mat.-Przyr. A.U., 28:1-176, Kraków.
- Kadłubowska J.Z., 1952, Desmidiaceae torfowiska na Marysinie III (Łódź), Acta Soc. Bot. Pol. 21(3):425-434.
- Kossinskaja E.K., 1960, Flora plantarum cryptogamarum URSS, 5, 1, Mosqua-Leningrad.

- Krawiecowa A., 1954, Glony, [in]: Bielawskie Błoto — ginące torfowisko atlantyckie Pomorza, Ochrona Przyrody 22:67-159.
- Krieger W., 1939, Die Desmidiaceen Europas mit Berücksichtigung der ausser-europäischen Arten, [in]: Rabenhorsts Kryptogamenflora, 13, 2, Leipzig.
- Migula W., 1907, Kryptogamen-Flora von Deutschland, Deutsch-Österreich und der Schweiz, 2, 1, Gera.
- Migula W., 1911, Die Desmidiaceen, Stuttgart.
- Raciborski M., 1888, Materiały do flory glonów Polski, Spraw. Kom. Fizj. A.U., 22, Kraków.
- Ryppowa H., 1927, Glony jeziorzek torfowcowych tzw. „Sucharów” w okolicy Wigier, Arch. Hydrobiol. i Ryb. 2:41-64.
- Tomaszewicz G.H., 1973, Desmids of transitional peats in Konik Stary near Warsaw, Acta Soc. Bot. Pol. 42(3):391-408.
- Wasyluk K., 1961, Glony torfowisk Kotliny Nowotarskiej, ze szczególnym uwzględnieniem desmidi, Fragm. Flor. et Geobot. 7(1):215-288.
- West W. et G.S., 1905, A Monograph of the British Desmidiaceae, 2, London.
- Wysocka H., 1934, Materiały do flory desmidyj z okolic Warszawy, Acta Soc. Bot. Pol. 11(1):119-137.

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Odmiana typowa a stadia rozwojowe Micrasterias truncata (Corda) Bréb.

Streszczenie

W trakcie opracowywania flory desmidi torfowisk przejściowych na Nizinie Mazowieckiej zwróciłam uwagę na dużą zmienność osobników zaliczanych do gatunku *Micrasterias truncata* var. *truncata*. Na podstawie analizy zebranego materiału stwierdziłam, iż wyróżnione niektóre odmiany powyższego taksonu (var. *crenata*, var. *neodamensis* i prawdopodobnie var. *bahusiensis*) stanowią stadia rozwojowe odmiany typowej.

Zestawiłam podawane przez różnych autorów wymiary długości i szerokości komórek oraz szerokości płatu szczytowego dla osobników odmiany *truncata* i odmiany *crenata* (lub *M. crenata*). Z załączonego wykresu wynika jasno, że osobniki odmiany *truncata* są zawsze większe od osobników odmiany *crenata*. Stanowi to jeszcze jeden argument potwierdzający moje obserwacje, ponieważ osobniki w stadium rozwojowym są z reguły mniejsze od osobników dojrzałych.

Wobec powyższego uważam, że taksony *M. truncata* var. *crenata* i *M. truncata* var. *neodamensis* powinny być traktowane jako synonimy *M. truncata* var. *truncata*.