ABNORMALITIES FOUND IN *TOKOPHRYA LEMNARUM* (STEIN), TOGETHER WITH THOSE PREVIOUSLY RECORDED IN THE SUCTORIA*

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FOUR FIGURES

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INTRODUCTION

In old cultures of the Protozoa, especially of ciliates, there appear often monstrous individuals resulting from incomplete division of the body. Such individuals are found in suctorians found in nature also.

In my culturing experiments of the fresh-water suctorian, *Tokophrya lemnarum* (Stein) performed from autumn 1938 to spring 1939, various abnormal individuals appeared. I will record in the following my observations of these specimens together with a brief review of the recorded cases of abnormality in the Suctoria.

MATERIAL

The suctorian was collected from Lake Biwa, near the Otsu Hydrobiological Station. As culture medium 50 cc. filtered pond water in a Petri dish 9 cm in diameter to which two rice grains were added, was used exclusively. Ciliates that multiplied in the medium, served as food for the suctorian.

OBSERVATIONS

The normal individual has the following characteristics:

Body of an inverted pyramid shape, depressed in one plane, with a fascicle of tentacles at each anterior angle; macronucleus spherical or ellipsoidal situated in the middle of body, a contractile vacuole in

* Work done in the Zoological Institute, Kyoto Imperial University.

the anterior part; slender, cylindrical stalk, 1.5–2.5 times as long as body which is 30–50 μ in length (Fig. 1).

The first abnormality found was stalkless individuals (Fig. 2). Such a suctorian lies on the bottom of the dish. It often secretes a new stalk lacking the dilated posterior end. Disappearance of tentacles in such an individual was commonly found, but this seemed to be a physiological phenomenon rather than an abnormality.

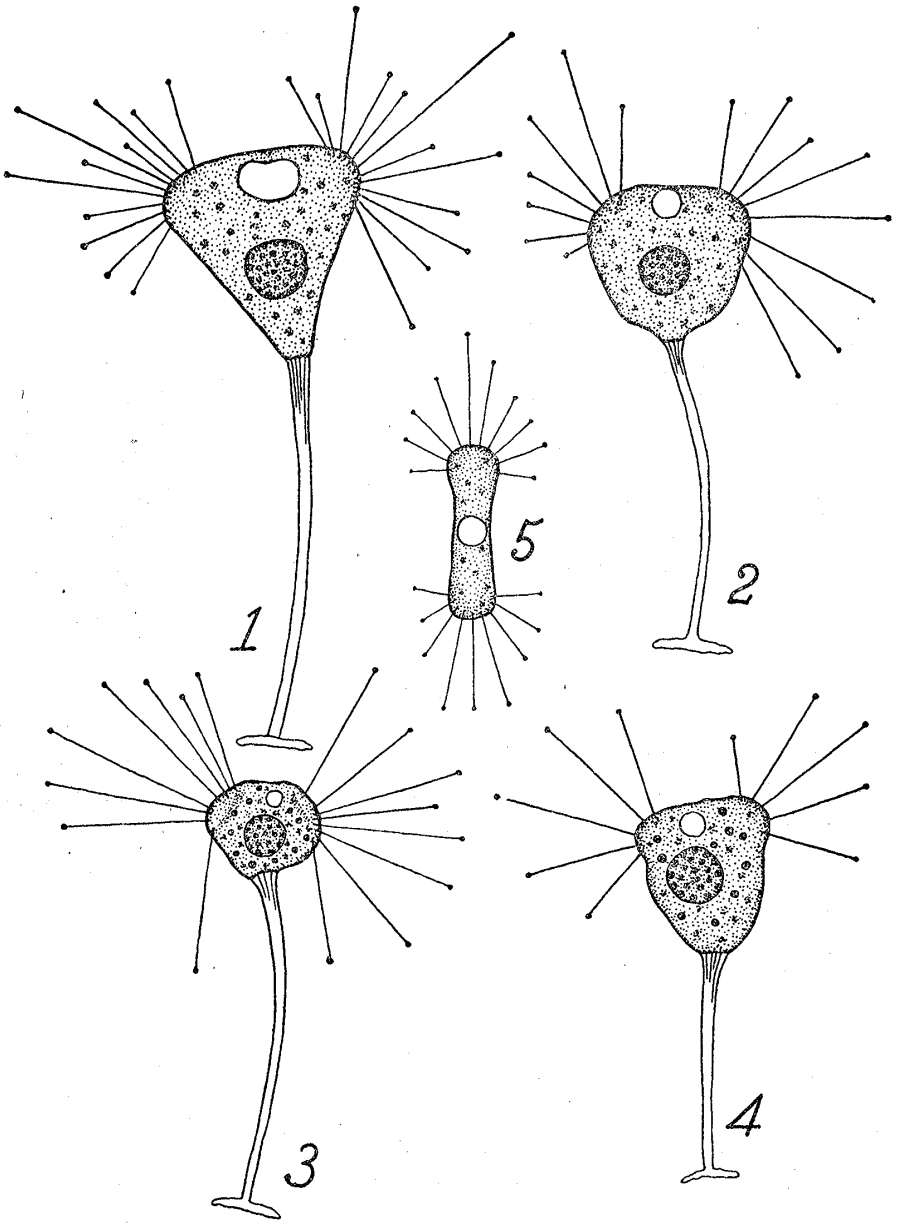

Fig. 1. Normal individuals of *Tokophrya lemnarum* (Stein).
1–4, lateral views; 5, apical view. All ×525.

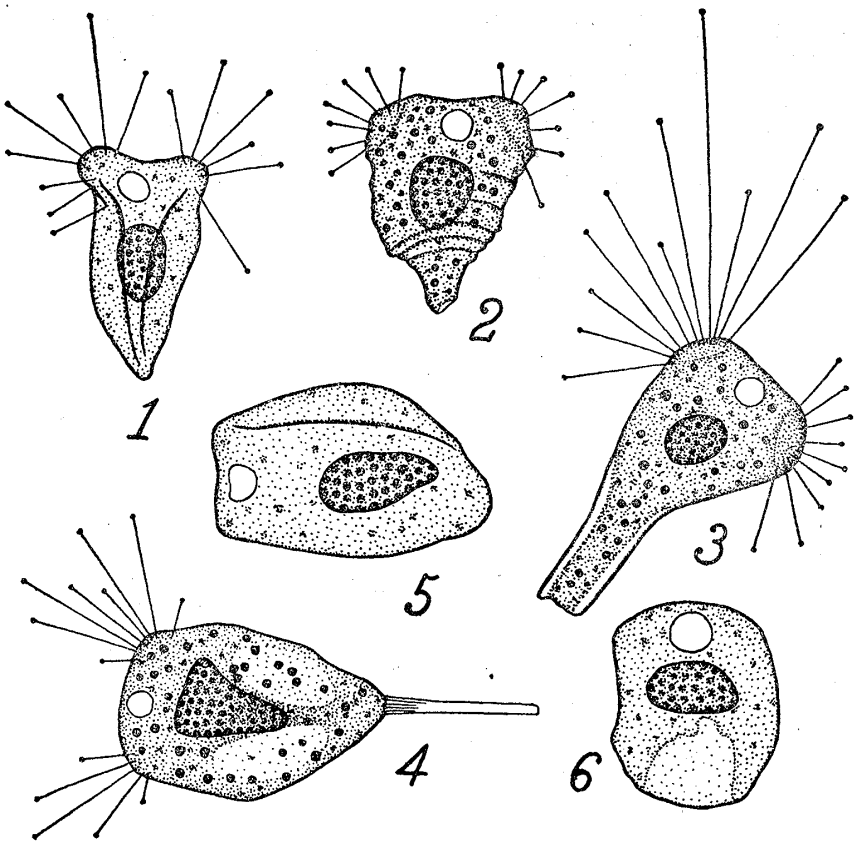

Fig. 2. Stalkless individuals.
1–3, common types; 4, individual with incomplete stalk; 5–6, individuals without tentacles. All ×525.

The second abnormality consisted in the elongation of the posterior half of the body (Fig. 3). The part of the body posterior to the macronucleus elongates 5–8 times that of the normal individual, giving the organism a monstrous appearance. This abnormality often appeared in the stalkless animal.

The third abnormality was found in the change of symmetry of the body, and also in the number and position of fascicles of tentacles (Fig. 4). Individuals with three fascicles appeared. As a result of this change, the body becomes triangular in the apical view (cf. Fig. 1). None of these specimens had a normal stalk.

The abnormal individuals were inoculated in a fresh culture medium, but the characteristics were not inherited and only normal offspring were produced.

DISCUSSION

Stalkless individuals have been recorded in *Podophrya* by Buck

(1884), Collin (1912–13) and others, and also in *Discophrya elongata* (Cl. et L.) (Collin 1911–12). The elongation of the posterior half of the body is known in *Tokophrya cyclopum* (Cl. et L.) (Collin 1911–12), *T. lemnarum* (Stein) (Collin 1912–13), *Acineta sulcata* Dons (1927) and in *A. valiabilis* Nozawa (1938). The change in the symmetry of the body,

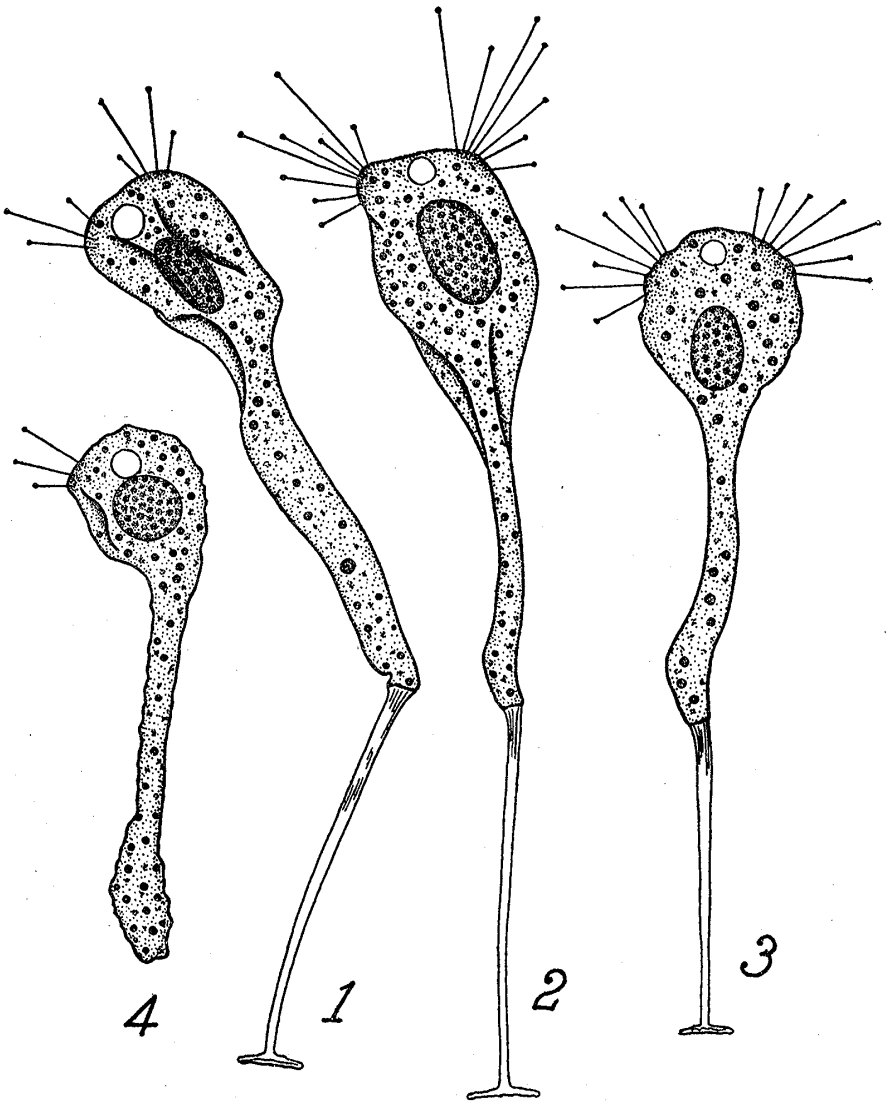

Fig. 3. Abnormal individuals with elongated posterior half of the body. 1–3, common types; 4, stalkless individual. All ×525.

and also in the number and position of fascicles of tentacles, has been found in *T. cyclopum* and *D. elongata* (Collin 1911–12)—in the former species individuals with one fascile and in the latter those with more than two fascicles are recorded.

To the abnormalities mentioned above, the formation of wrinkles

on the test may be added. Kahl (1934) summarizes the records of this kind of abnormality by previous investigators on *Acineta foetida* Maupas; I have reported another case in *A. variabilis* (1938).

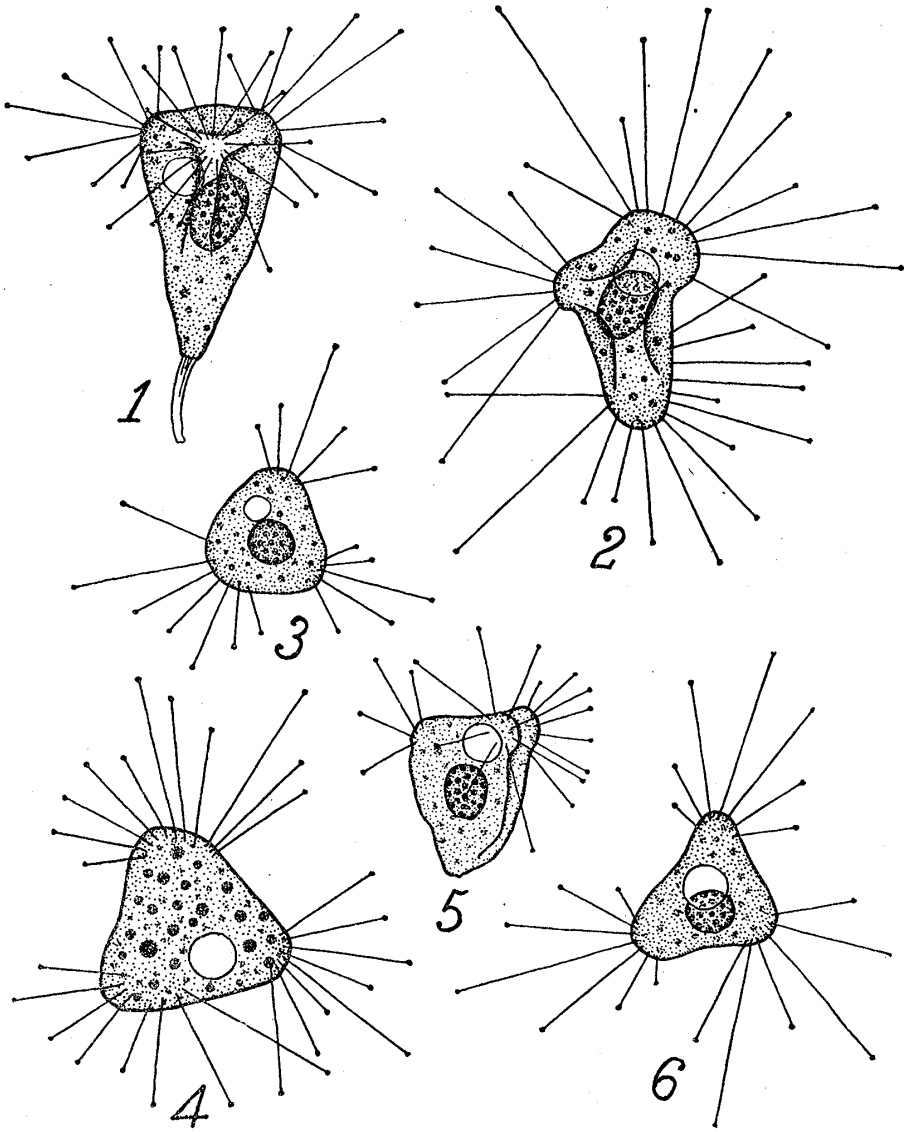

Fig. 4. Abnormal individuals with three fascicles of tentacles. 1, 5, lateral views; 2, 6, apical views of the same respectively; 3–4, apical views. Note their regular triradial organization. All ×525.

The knowledge of the abnormalities such as mentioned above seems to be important for the taxonomy of the Suctoria. For instance, stalkless individuals of *Podophrya* might be classified under another genus *Sphaerophrya* which has no stalk all through its life history, stalkless individuals of *Discophrya elongata* such as recorded by Collin (1911–12), might be placed in the genus *Trichophrya* which has several

fascicles of tentacles but no stalk, if the origin of those features were unknown. Individuals of *Tokophrya lemnarum* with three fascicles recorded above might be regarded as a new species if they were found in the natural condition. The formation of wrinkles in the test may be either sporadical as in *A. foetida* and *A. variabilis* or of a specific character as in *A. sulcata* and *A. anulata* Wang.

The general form of the body, its size, presence or absence of the stalk, and the number and position of the fascicles of tentacles, are all important for the taxonomy of the Suctoria. Neverthless these features are easily changed according to the environmental condition, and abnormalities are found in various genera and species and often give the affected individuals a similarity to a different species. Thus the knowledge of abnormality seems to be indispensable for the identification and description of the Suctoria.

SUMMARY

1. Some abnormalities found in *Tokophrya lemnarum* (Stein) are described, together with a brief review of those cases previously recorded in the Suctoria.

2. The abnormalities may be classified under four types: 1) the stalkless state, 2) the elongation of the posterior half of the body, 3) the change in the symmetry of the body and also in the number and position of tentacle fascicles, and 4) the formation of wrinkles on the test.

3. The taxonomic importance of the knowledge of the abnormalities is pointed out.

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