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ON THE GROWTH RATE OF THE FOLIICOLOUS LICHEN STRIGULA ELEGANS

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The diametral growth rate of the foliicolous lichen *Strigula elegans* (Fée) Müll. Arg., measured under natural conditions in the African tropical rainforest, has been established to amount to (0.7–)3–3.6(–8) mm annually. As compared to the diametral growth rate of lichens from temperate regions, which are reputed to be slow growers, there is no essential difference.

In 1964, while working in the Laboratory of Hydrobiology near Yaoundé, Camerouns, I had the opportunity of studying the growth rate of the fungus component of *Strigula elegans* (Fée) Müll. Arg. Besides, I did some observations on the growth rate of the lichen thallus under natural conditions. These conditions were prevalent in a certain part of the rainforest close to the laboratory, where the leaves of the underscrub were covered with the present species.

Strigula elegans is a foliicolous subcuticular lichen commonly found in all tropical regions on leaves of various, mostly Dicotyledonous, shrubs. With some experience it is easily recognized among other foliicolous lichens by the pale or bright green, irregularly circular or asteroid blotches of up to *c.* 10 mm across, generally set with minute blackish spots, which are pycnidia or perithecia. It is not too difficult to identify the species with certainty by microscopically examining the paraphyses and ascospores in the perithecium. An extensive description of the species has been given by Santesson (1952: 160–174).

The observations were made in order to find out whether this tropical lichen has a faster growth rate than slow-growing temperate species, of which the fungus components are such slow growers in the laboratory, and whether, consequently, the fungus component of foliicolous lichens may be more suitable for physiological experiments.

There exists an extensive literature on the growth rate of temperate lichens, for the consultation of which the reader is referred to the bibliography. Unfortunately the available data are not fully comparable as the species are different in each case, while the way in which the growth rate is expressed is not homogeneous. Moreover, the climatic conditions (particularly humidity and temperature), as well as substrate and the age of the thallus, all of which are of great influence, appear to have been very different in the circumstances in which the various authors worked. Apart from all this, however, it may be summarized that the diametral growth rate of the thallus—which is the way in which the growth is most commonly expressed in literature—in temperate foliaceous and crustaceous

lichens roughly varies between 0.5–10 mm per year; the growth may be as little as 0.25–0.7 mm per year in *Rhizocarpon geographicum*, or as much as 20–30 mm in certain species of *Parmelia* and *Peltigera*.

My own observations were made during the second rainy season of the year, namely from August till November. Relative humidity in the forest was not measured, but may be taken to be fairly high. The forest was as a rule moistened daily by a shower, while the humidity readings of the meteorological service at Yaoundé during these months ranged from a daily minimum of *c.* 65 % to a daily maximum of *c.* 97 %. The altitude of Yaoundé is *c.* 700 m, while the temperature, registered by a maximum-minimum thermometer placed among the leaves, was found to vary from 15–19° C (at night) to 24–31° C (during daytime).

As suitable leaves for carrying out the experiment the more or less coriaceous leaves of *Acanthus montanus* (Acanthaceae) and *Chaetacme microcarpa* (Ulmaceae) were chosen that had recently developed to mature size and were colonized with young thalli of *c.* 0.1–1 mm across. Enlarged and accurate drawings were made of the shape and nervation of three leaves of *Acanthus* and one leave of *Chaetacme*, while the position of each of the numerous young thalli was accurately marked and numbered. The approximate sizes of the thalli were measured with the aid of a hand-lens. Three months later each thallus was measured again. Thus, the growth of 232 thalli during a period of three months was established. The data given in the table below show minimum, average, and maximum growth respectively of each group of thalli on the leaves studied converted into values for a period of one year.

TABLE I

MEASURED AND CALCULATED VALUES OF THALLUS GROWTH IN STRIGULA ELEGANS

Host	Number of thalli per leaf	Diametral thallus growth values as actually measured	Diametral thallus growth converted into 1 year values
Acanthus I	51	(0.2–)1.1(–2.4) mm/110 days	(0.7–)3.6(–8) mm
Acanthus II	70	(0.4–)0.7(–1.0) mm/86 days	(1.7–)3(–4.2) mm
Acanthus III	49	(0.2–)0.7(–1.1) mm/85 days	(0.9–)3(–4.7) mm
Chaetacme	62	(0.2–)1.0(–2.1) mm/108 days	(0.7–)3.4(–7.1) mm

After three months most thalli, all of which were sterile when measured for the first time, had developed one to several (1–10) pycnidia and/or (0–3) perithecia.

It is a well known fact that the growth of any organism, plotted in a system of co-ordinates, is represented by a curved line, the slope of which tends to diminish with time. Therefore the extrapolation of the values in the case of *Strigula elegans*

contains an element of incertitude, if not inaccuracy. On the other hand, the calculated values agree quite well with those found in nature. The maximum size of the thalli of *Strigula elegans* was found to range from 2 to 5(–10) mm (own observations, and Santesson, 1952: 162). Assuming that (i) the approximate lifetime of Dicotyledonous leaves in the tropics is about 13–14 months (Richards, 1957: 193), and (ii) the first visible thalli appear on leaves *c.* 2 months old, there is one year left for the lichen to grow and produce perithecia. Apparently, the maximum size observed in nature and the calculated growth are well in accordance with each other.

The conclusion that can be drawn from the foregoing is that the growth rate of the tropical foliicolous lichen *Strigula elegans* does not differ markedly from that of temperate lichens generally.

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