Short Communication

Hideo Toriyama: The Behaviour of the Sensitive Plant in a Typhoon

Received June 26, 1966

The influence of environmental factors upon the bending movement of Mimosa pudica has been investigated by Bose¹, Herbert², Koketsu³, Wallace⁴,⁵, Brukholder and Pratt⁶, etc., but there have been few reports on the behaviour of the sensitive plant in natural environments. In order to analyze the plant’s seismonasty, however, it is important to study the behaviour of the plant under every kind of natural and artificial condition. For this purpose it is necessary to deal with it in relation to the behaviour of the pulvinus and from the cytophysiological point of view.

When a typhoon** hit the Tokyo area on August 13, 1960, we observed a remarkable phenomenon; the sensitive plants in an open field became non-reactive. Even when the stem of a plant was cut by scissors, it did not exhibit any bending movement (Fig. 1a). On the other hand, the plant which had been kept in the room, showed the obvious movement by the same treatment (Fig. 1b).

Small pieces of the motor tissue of both the non-reactive and reactive main pulvinus were fixed for 24 hours in a 5 per cent potassium dichromate. After thoroughly washed in running water for 10 hours, the fixed materials were cut 30 to 50 µ thick with a hand microtome. The sections were washed in water.

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** Atmospheric pressure, 1008.6 mb; temperature, 28.6°; wind velocity, 13.4 m/sec. (mean), 22.6 m/sec. (max); relative humidity, 75% at 12.00 a.m. in the Tokyo area.
and then mounted in pure glycerine. This technique gave excellent results in demonstrating the protoplast of motor tissue-cells. In the non-reactive pulvinus, both the tannin vacuole and the colloidal substance appeared in the motor cells (Fig. 2). However, after receiving a stimulus (in the reactive pulvinus), the colloidal substance disappeared from the vacuole, while the tannin vacuole could still be observed in the motor cells (Fig. 3). It is worth mentioning that the contents of the non-reactive tissue-cells were the same as those of the tissue-cells anaesthetized with ether vapour.

In the laboratory, sensitive plants in pots were treated with several degrees of artificial wind from an electric fan; the plants thus were made to tremble for ten hours. Under these artificial conditions the seismonasty of the plants could be observed. Meanwhile, young sensitive plants set in pots and placed at an open window were trembling in the natural wind. The main pulvinus of all these young plants became non-reactive. Dr. S. Satō of Nippon Women’s University has recently observed the same phenomenon.

As has been mentioned above the behaviour of sensitive plants in a natural and/or an artificial wind is very complicated and inscrutable. Further studies of the behaviour of sensitive plants under many natural and artificial environmental conditions are necessary. At this juncture it is especially desirable that botanists from all over the world send to our laboratory the data on the behaviour of *Mimosa pudica* in many kinds of storm.

References

1) Bose, J. C., Researches on Irritability of Plants (Longmanns, Green, and Co., London, 1913).
5) ———, ibid. 18: 215 (1931).
6) Burkholder, P. R., and Pratt, R., ibid. 23: 46 (1936).
8) Satō, S., private communication.