The soft and colourless pupal cuticles just after pupation turned to a natural amber colour when immersed in protocatechuic acid, but it became purplish black in tyrosine, brown in catechol and pale amber in 3,4-dihydroxyphenyl acetic acid. Thus it appears probable that protocatechuic acid plays an important part in the darkening and hardening of the cuticle of silkworm.

Besides (*A*), another phenolic spot (*B*), was found on the chromatogram, and two more unknown phenolic substances were detected in the crude methanol extract. These phenols will be discussed elsewhere.

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Effect of Gibberellin and Indoleacetic Acid on Seta Elongation in *Pellia epiphylla*

IN Great Britain the sporogonium of *Pellia epiphylla* is fully differentiated into foot, seta and capsule by the end of September. Under natural conditions elongation of the seta, resulting from the extension of its individual cells, does not take place until the following year, usually from late February onwards. Elongation appears to follow the maturation of the spores of which external indication is given by a darkening of the capsule wall. During a period of not more than 3–4 days the seta elongates from 1 mm. to upwards of 80 mm.

Wagner[1] has suggested that the stimulus for elongation comes from the capsule and that it originates from the production of auxin during, or following, spore production.

In January, plants of *Pellia epiphylla*, bearing 25 sporophytes with mature capsules but non-elongated setæ, were placed in Petri dishes and sprayed with a solution of 100 p.p.m. potassium gibberellate ('Gibrel', Merck), to which a little wetting agent had been added. Controls were sprayed with water. All plants were kept at 18° C. and exposed to natural daylight and day-length for this period of the year. In all treated plants full seta elongation occurred and reached an average length of 57 mm. after 5 days. The controls were unaffected.

An experiment was also performed with twenty-four intact sporogonia which had been dissected from the thallus. All those treated with potassium gibberellate showed a slight elongation (7–10 mm.), the controls being unaffected. To these excised sporogonia was now added a solution of 1·0 p.p.m. of indoleacetic acid. In all the sporogonia treated with both substances full elongation of the setæ occurred (average length, 63 mm.). Those treated with indoleacetic acid alone showed some elongation (average length, 37 mm.).

Previous experiments had shown that indoleacetic acid alone added to the isolated dormant sporophyte, or sprayed on the intact plant, stimulates elongation of the seta.

We have shown, then, that the dormant seta may react in the following way: (*a*) intact plant (sporophyte attached to gametophyte), potassium gibberellate or indoleacetic acid stimulates elongation; (*b*) isolated sporophyte, (1) potassium gibberellate produces only slight elongation (7–10 mm.), (2) indoleacetic acid following potassium gibberellate gives full elongation (63 mm.), (3) indoleacetic acid alone produces elongation (37 mm.).

If we accept the idea that cell elongation is dependent, either partially or entirely, upon auxin supply, and this is supported by (*b*2) and (*b*3) above, it must be concluded that the dormant seta contains little or no auxin. In Nature the dormant period from October to February is then due, in part at least, to the absence of auxin. Furthermore, it would appear that the gametophyte is capable of producing auxin or some precursor by January at least, since upon addition of potassium gibberellate full seta elongation follows. This experiment seems to cast some doubt upon the validity of the supposition that the auxin required for seta elongation in Nature is necessarily derived from the capsule. Similar results to the above have been obtained in experiments on the intact plants of other liverworts.

The experiments with the intact plant lead to speculation as to the nature of the factors governing the dormancy of the cells of the seta. One possibility, but we think an unlikely one, is that auxin is present in the thallus but is unable to diffuse to the seta during the dormant period unless some growth-regulator of the gibberellin type is present. An alternative explanation is that the potassium gibberellate acts on the cells of the thallus by removing an auxin inhibitor, or by activating an auxin precursor (cf. ref. 2). There is, however, some evidence that treatment of the excised sporophyte with indoleacetic acid alone produces less elongation than indoleacetic acid and potassium gibberellate—an average of 37 mm. as compared with 63 mm. respectively. Further experiments are in progress to check on this point.

Pellia differs from other members of the Jungermanniales in that division of the spores occurs prior to their discharge from the capsule. Those sporogonia which had been treated with gibberellin developed rhizoidal outgrowths from the multicellular spores. In Nature this does not occur until after spore dispersal.

So far as we are aware, this is the first report of a response by liverworts to gibberellin. A full account will be given elsewhere. We are indebted to Merck and Co. for presenting the 'Gibrel' used in these experiments.

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