compartment that may run the whole length of the photoreceptor cell.

*Methods.* Drones were obtained from Mr N. Merin, Chicun Amal, Hadera, Israel, and kept in an unilluminated, but not light-tight, cupboard for up to three weeks, fed by workers who were supplied with sucrose and water. The head was cut off under a table lamp within 5 min of removal from the cupboard, and by slicing parallel to the axes of the retinulae a piece of retina corresponding to about 1 mm square of cornea was obtained. A thread was attached to the cornea with Cyanolit and used to suspend the tissue so that the retinulae remained straight. After fixation for 4 h in glutaraldehyde 3.25%, in a standard cacodylate buffer (75 mM, pH 7.3), the tissue was washed overnight in the buffer. It was postfixed for 1 h in osmium tetroxide 2%, in the buffer, dehydrated in an ethanol series, and embedded in Spurr's resin[16]. Ultrathin sections (600–700 Å) were cut parallel to the long axes of the retinulae with a Reichert-Jung Ultracut and stained first with uranyl acetate 2%, in ethanol 50%, and then with lead citrate according to Reynolds[17]. The sections were examined with a Philips EM 300 operated at 80 kV.

*Results and discussion.* In most sections the subrhabdomeric cisternae had the fenestrated appearance described previously by Perrelet[3] for the drone and Walz[13] for *Calliphora.* Thirteen photographs were examined of sections cut accurately parallel to the rhabdom, as in the figure. In all of these, a lumen could be traced that was continuous over a distance corresponding to at least 10 μm of rhabdom. In 10 of the 13, the continuity of the lumen extended over the whole field of the photograph. In the 3 cases where a barrier was observed, it was not associated with any obvious specialized structure and the simplest explanation is that the lumen passed out of the plane of the section. In figure B the continuity of the lumen is indicated over a distance of 12 μm, and we suggest that it may extend over the whole length of the photoreceptor cell. From figures A and B, and from the earlier work of Perrelet[3], it appears that the cisternae form an elongated cylinder traversed longitudinally by tubes of cytoplasm. These tubes have side branches that join the bulk of the cytoplasm, particularly on the side close to the rhabdom. Thus, the cisternal compartment has a very high surface-to-volume ratio, a feature which would facilitate rapid exchanges between the interior of the cisternae and the cytoplasm.

The sarcoplasmic reticulum of striated muscle is another endoplasmic reticulum with elongated elements and these elements are presumably capable of propagating a signal from the T system to the center of the sarcomere, a distance of about 1 μm (see, e.g., Endo[18]). The distance over which light adaptation can spread in the drone photoreceptor is at least 200 times greater, but the present results raise the possibility that the subrhabdomeric cisternae have a feature that might be useful for propagating a signal, namely continuity of the lumen.

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## Effect of mercuric acetate on mobilization of N and P during germination and seedling growth of *Cicer arietinum*

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*Summay.* Mercuric acetate, at $5.0 \times 10^{-5}$ M, stimulates the mobilization of total nitrogen and phosphate reserves from cotyledons during seedling growth in *Cicer arietinum* cv H208 whereas it suppresses the same process at $2.5 \times 10^{-4}$ M.

*Key words. Cicer arietinum;* mercuric acetate; seedling growth; germination.

Mercury, one of the most toxic heavy metals, is known to be accumulated by the vegetation in Hg-polluted areas[2] and to have deleterious biological effects. Severe effects of Hg on plant processes like photosynthesis, respiration and transpiration, etc. have been observed by several workers[3]. In contrast, we found that mercury (as mercuric acetate) at lower concentrations promotes the formation of chlorophylls in etiolated seedlings of cucurbits and germination and seedling development in certain legumes whereas, at higher concentrations, it causes an inhibition in all these parameters[4]. To sort out the basis for the differential effect of Hg concentrations on seedling establishment, the work was extended to investigate the effects of mercuric acetate on mobilization of N and P reserves from cotyledons to the growing axis in *Cicer arietinum.*

Uniform, surface-sterilized seeds of *Cicer arietinum* cv H208 were soaked at 25 ± 2 °C for 24 h in distilled water (control) and $5.0 \times 10^{-5}$ M and $2.5 \times 10^{-4}$ M mercuric acetate solutions. Thereafter, 50 seeds were transferred to wet filter papers in Petri dishes for germination in the dark at 25 ± 2 °C. Samples were taken at 5, 7 and 9 days after imbibition. Total nitrogen was estimated by the micokjeldahl method[5], and total phosphate was determined spectrophotometrically at 625 nm using molybdate[6].

Mobilization of total nitrogen and phosphate reserves from cotyledons during development of the seedling is observed to be differentially affected by mercuric acetate concentrations (figs 1 and 2). In the control, total N-content of radicle and epicotyl increases steadily with the age of the seedling, and this

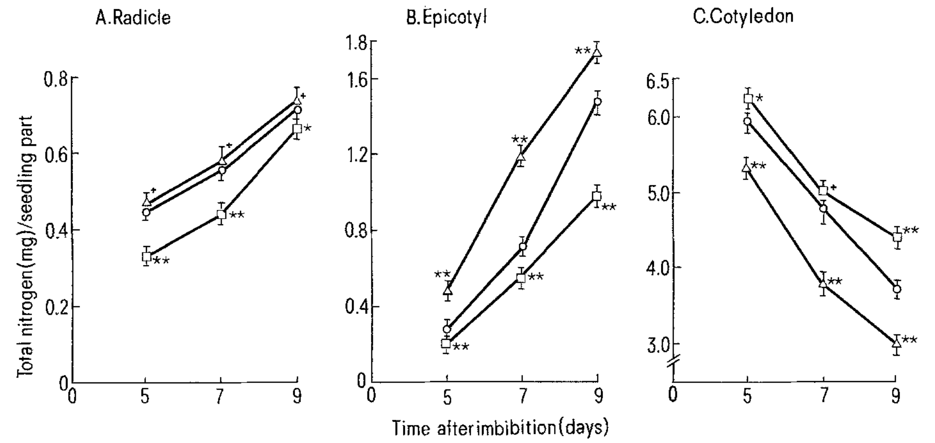

Figure 1. Effect of mercuric acetate on total nitrogen content of radicale (A), epicotyl (B) and cotyledon (C) of *Cicer arietinum* during germination and seedling development. ○–○: control; △–△: $5.0 \times 10^{-5}$ M mercuric acetate; □–□: $2.5 \times 10^{-4}$ M mercuric acetate. Vertical bars represent SD; ** significant with $p \leq 0.01$; * significant with $p \leq 0.05$; + not significant.

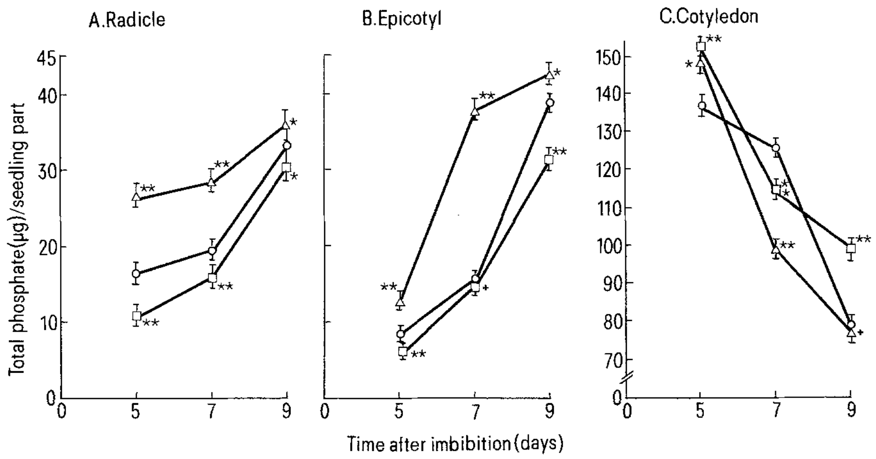

Figure 2. Effect of mercuric acetate on total phosphate content of radicale (A), epicotyl (B) and cotyledon (C) of *Cicer arietinum* during germination and seedling development. ○–○: control; △–△: $5.0 \times 10^{-5}$ M mercuric aceteate; □–□: $2.5 \times 10^{-4}$ M mercuric acetate. Vertical bars represent SD; ** significant with $p \leq 0.01$; * significant with $p \leq 0.05$; + not significant.

increase is paralleled by a decline in the N-content of the cotyledons (fig. 1). The extent of this mobilization, however, is affected by mercuric acetate. Mercuric acetate at the lower concentration used accelerates the mobilization, whereas at a higher concentration there is a marked suppression of the process. Mobilization of total phosphate reserves from cotyledons to the growing axis is influenced by mercuric acetate almost like mobilization of total N. Thus, the decline of total phosphate level in cotyledons is stimulated by mercuric acetate at $5.0 \times 10^{-5}$ M during the 9 days after imbibition. At a concentration of $2.5 \times 10^{-4}$ M, mercuric acetate inhibits this decline. Although the extent of total N and P decrease in the cotyledons is influenced by mercuric acetate, the patterns of mobilization remain unaltered at both concentrations. Based on these observations, it is suggested that differential influence of mercuric acetate on the mobilization machinery for cotyledonary reserves could account for its differential effects on seedling growth.

Since $Hg^{2+}$ has an affinity with –SH groups of amino acids[7], it might be affecting the activity of hydrolytic enzymes and in turn the mobilization of reserves during seedling establishment.

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