cockroach repellents[8], had a gradual and partial inhibitory effect on the antennal activity, with an apparent recovery after the repellent vapors were cut off; their behavioral effect was in accord with their electrophysiological effect (Figures 3 and 4, Table). MGK-264, the smell of which is stronger to the human nose than DEET and R-11, is non-repellent to cockroaches[8]. This material did not affect the EAG or the behavioral response of the insect (Figures 3 and 4, Table). Similar results were obtained with glycerol.

It is suggested that the partial blocking effect on EAG response, followed by a relatively fast recovery, is a typical feature of insect repellents. The practical implications of this suggestion require further investigations[9].

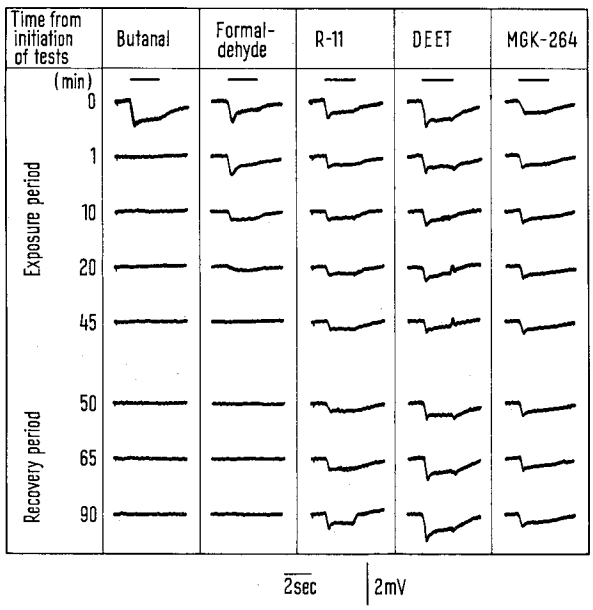

Fig. 4. EAG recordings from *P. americana* stimulated by amylacetate before (time 0), during (1–45 min) and after (50–90 min) exposure to various odorants. For each odor a different cockroach was used.

Zusammenfassung. Die elektrische Reaktion der Antennenrezeptoren von *Periplaneta americana* auf Reizung mit Amylacetat wird durch Formaldehyd, Propanal, Butanal, Cyanid und Aethylacetat vollständig gehemmt. Die Repellentien DEET und R-11 ergeben teilweise, Glyzerin und MGK-264 keine Hemmung. Antennogrammhemmung und Verhaltensreaktion ganzer Tiere sind korreliert, ausgenommen bei Formaldehyd, das sich im Verhaltenstest als hypersensibilisierend erweist.

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Estrogens in 2-Chloroethylphosphonic Acid Induced Femaleness of *Cucurbita pepo* L.

Flower sex expression is subjected to genetic, environmental and chemical controls and may be regulated by endogenous levels of growth substances. Treatment with gibberellins usually increases the male tendency of cucumber and other plants[1,2] while treatment with auxins[3], growth retardants[4] or 2-chloroethylphosphonic acid (CEPHA)[5] induces femaleness. The influence of steroidal hormones on flower sex expression in plants was also stated. Löve and Löve[6] have found that these substances could produce male or female flower on *Melandrium dioecum*, if either androgens or estrogens are applied to the stems before flowering. Estrogens also increased the number of female flowers in *Ecballium elaterium* (L.) A. Rich[7].

The present investigation was undertaken to test whether the induction of femaleness by CEPHA, a substitute for ethylene, is connected with simultaneously occurring effect of this compound on endogenous estrogens content in pumpkin plants.

Material and methods. Monoecious plants of *Cucurbita pepo* L., cv. Weiser Bush were grown in clay pots during spring and summer (March 10 till July 13, 1971) in the greenhouse at maximum and minimum temperatures of 26 and 17 °C, respectively. CEPHA (AmChem formulation 68–250) was applied as aqueous foliar spray in 2 treatments, each at concentration of 200 ppm. Sprays were carried out to run-off at both 4th and 7th leaf stages when the plants were 42 and 49 days old, respectively, and the critical true leaves were 1 cm in diameter. Control plants were sprayed with distilled water. Number of male and female flowers produced by each plant was recorded, the observations being made every second day. First opened male flower appeared on May 14 and female one on May 26 on control plants, while on the CEPHAL-treated plants the first opened female flowers – on May 22; no male flowers appeared on treated plants until June 18.

Material for estrogens determination was taken at time indicated in the Table. Whole plants deprived of the roots, flowers and infructescences were used. Frozen material was homogenized with hot methanol and the homogenate was filtered. The filter cake was being extracted in a Soxhlet apparatus with benzene-methanol mixture (3:1) for 6 h. The methods of extraction, fractionation and rechromatography procedure were the same as described previously[8]. For the quantitative determination of the

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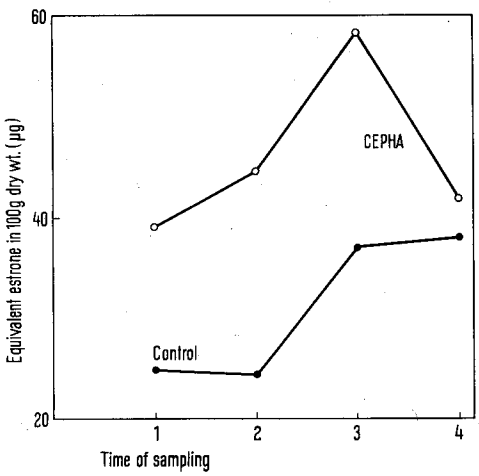
estrogens, the Kober colour reaction was applied[9]. The extinction was measured in a Specol Spectrocolorimeter at 474, 515 and 556 nm, against similarly treated reagents blanks in 10 mm glass cells. The readings were corrected for unspecific background colour by applying $E_{corr.} = 2E_{515} - (E_{474} + E_{556})$[9]. The content of estrogens was expressed as µg equivalent of estrone in 100 g of dry weight.

Results and discussion. The results obtained demonstrate clearly that CEPHA promoted femaleness (Table) at the same time when considerably more estrogens was found in CEPHA-treated plants than in control ones (Figure).



Estrogens content in control and CEPHA-treated plants of *Cucurbita pepo* L.

CEPHA-modified sex expression of *Cucurbita pepo* L. at the time of sampling for endogenous estrogens

Time of sampling	Total No. of flowers per plant[a, b, c]		Female flowers (%)	
	Control	CEPHA	Control	CEPHA
1 (May 4)	Flower buds visible			
2 (May 16)	14.2	13.2	0	100.0
3 (May 27)	39.9	29.4	2.5	100.0
4 (July 13)	109.9	100.7	9.0	47.8

[a] Opened and unopened. [b] Recorded until prevalence of the male flowers on CEPHA-treated plants. [c] Average values for 6 plants.

Moreover, the beginning of male flowers formation in CEPHA-treated plants was accompanied by considerable decrease in estrogens content.

It has generally been suggested that sex expression in *Cucurbitaceae* is regulated by endogenous auxin-gibberellin balance, with high auxin tending to produce femaleness[5]. In the present experiment, externally applied ethylene (in the form of CEPHA) did induce femaleness but, as may be seen from our other work[10], carried out simultaneously on the very same samples of plant material, no positive correlation between femaleness and auxins content was found either in CEPHA-treated or control plants. Increased femaleness in other cucurbita, viz. muskmelon, was reported as being caused also by growth retardant (B-995)[11] known to reduce endogenous auxins content[12]. It is likely, therefore, that production of pistillate flowers need not necessarily be correlated with an increase in the amount of auxins. This suggests lack of auxins specificity in sex differentiation of plants.

On the other hand, higher level of endogenous estrogens in plants in which femaleness was purposely induced (Table, Figure), as well as the data from the literature on female sex tendency caused by exogenously applied estrogens[6, 7], show that these compounds may be responsible for the manifestation of female sex in plants as they are in animal organisms.

In order to test this hypothesis, data must be obtained on estrogens content in more species of plants with femaleness induced also by environmental factors as well as genetically determined[13].

Résumé. L'acide 2-chloroéthylphosphonique (un substitut de l'éthylène) augmente la féminité de *Cucurbita pepo* L. On observe en même temps une augmentation des œstrogènes endogènes. Il est possible que ces derniers participent à la différenciation du sexe chez les plantes.

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A Unique Mode of Multiplication of Basidiospores in *Ravenelia hobsoni* (Uredinales)

During the course of his studies on the rust *Ravenelia hobsoni* Cooke infecting leaves of *Pongamia pinnata* Merr., NAIR[1] obtained successful germination of the teliospores and made some interesting observations on the mode of multiplication of basidiospores of this rust fungus. This note describes the occurrence of a unique mode of multiplication of the basidiospores of this rust fungus through the mechanism of binary fission, the like of which has not been so far reported in the Uredinales.

Germination of teliospores was readily obtained through a technique already reported by NAIR[1]. At the end of 18 h

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