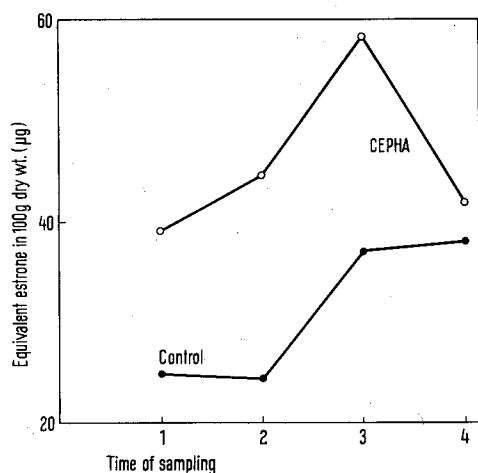


estrogens, the Kober colour reaction was applied⁹. The extinction was measured in a Specol Spectrocolorimeter at 474, 515 and 556 nm, against similarly treated reagents blanks in 10 mm glass cells. The readings were corrected for unspecific background colour by applying $E_{corr.} = 2E_{515} - (E_{474} + E_{556})$ 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 femaleness⁵. In the present experiment, externally applied ethylene (in the form of CEPHA) did induce femaleness but, as may be seen from our other work¹⁰, 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 content¹². 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 determined¹³.

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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Toruń (Poland), 20 September 1971.

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¹³ Acknowledgments: We are grateful to Amchem Products, Inc., Ambler (Pa., USA) for a gift sample of 2-chloroethylphosphonic acid (Ethrel formulation 68-250).

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., NAIR¹ 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

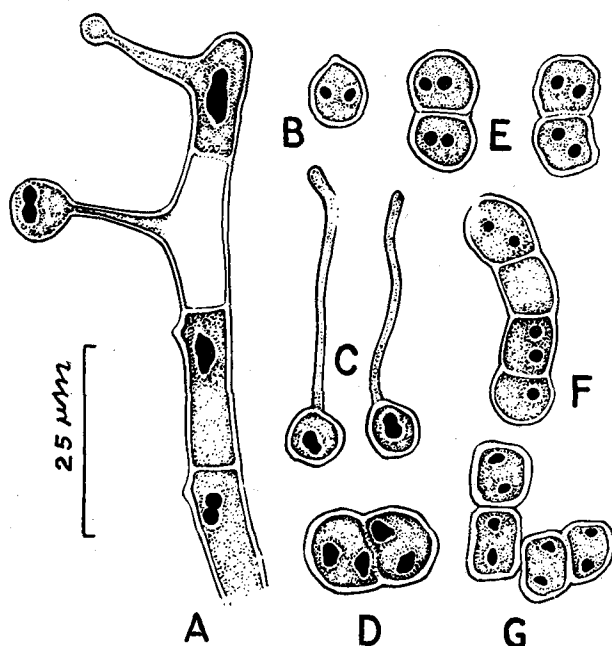
the mechanism of binary fission, the like of which has not been so far reported in the Uredinales.

Germination of teliospores was readily obtained through a technique already reported by NAIR¹. At the end of 18 h

¹ K. R. GOPINATHAN NAIR, in press.

of their germination, the basidiospores at different stages of development were fixed in Carnoy's fixative and stained with Hematoxylin and counter stained with light green.

Normally the teliospores of this rust produced a four-celled basidium and equal number of basidiospores borne on long acicular sterigmata (Figure A). The basidiospores so produced normally germinate by a long spindle-shaped germ tube, either while still attached to the sterigmata, or in detached condition (Figure C). Occasionally, however, instead of producing germ tubes, some basidiospores were found to multiply and produce secondary, tertiary and even quaternary crops of basidiospores either through mechanism of proliferation (NAIR²) or binary fission type of cell multiplication. The occurrence of the phenomenon of 'binary fission' in the process of multiplication of basidiospores had not been reported previously in the rust fungi and stimulated further interest and lead to detailed observations of this unique behaviour, the results of which are presented in this brief note.



Sporidia of *Ravenelia hobsoni*. A) 4-celled basidium with basidiospores. B) Binucleated basidiospore. C) Germinating basidiospores. D) Quadrinucleated status of basidiospore during the process of multiplication. E) Formation of secondary basidiospores through fission. F) Basidiospores in chain after two consecutive divisions. G) Separation of basidiospores after cell division.

Prior to the process of 'cell division' or binary fission, the basidiospores were observed to swell in size. Such basidiospores then elongate, attain a binucleate, or quadri-nucleate status (Figure D) depending upon their initial nuclear status and start multiplication through simple cell division laying down cross septa in the process, thus resulting in the development of a secondary basidiospore, very similar in nuclear status to the parent spore (Figure E). The cell division occurs at right angles to the main axis of the spore separating the newly formed secondary spore by a septum of its own very similar to the mechanism involved in 'binary fission'. The secondary basidiospores were eventually found to break away from the mother spore along the line of the newly formed septum (Figure G). This process was repeated several times to give the appearance of a chain of four or more basidiospores (Figure F), and took less than 18 h to complete. The secondary basidiospores so produced were doliform in shape (Figure G) as compared to the napiform nature of the primary basidiospores (Figure B).

Preliminary cytological studies show that the primary basidiospores in this fungus may be either uninucleate or binucleate, the first two phases of the meiotic division taking place in the basidium proper and the third mitotic division in the basidium or the resulting basidiospores. It was of interest to note that the process of binary fission or cell division described above was common to both uninucleate and binucleate basidiospores and was thus independent of the nuclear status of the parent basidiospores.

This mode of multiplication by simple cell division or binary fission is a common feature with members of Schizomycetes, Schizosacharomycetes and other unicellular organisms and is being reported for the first time in the rust fungi.

Zusammenfassung. Erster Bericht über die Vervielfältigung von Sporidien durch binäre Spaltung bei *Ravenelia hobsoni*.

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Law College Road, Poona 4 (India), 15 May 1971.

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Zum Schlüpfprozess bei Fischen: I. Der Aufbau der Eihülle und ihre Veränderungen während der Keimesentwicklung bei der Forelle (*Salmo trutta fario* L.)

Die Entwicklung vieler Fische vollzieht sich unter dem Schutz einer Eihülle, die durch Sekretion eines oder mehrerer Stoffe (Enzyme) aus häutigen Drüsen des Embryos aufgelöst werden soll¹. Da sich diese Drüsen schon relativ früh in der Entwicklung (Augenpunktstadium) nachweisen lassen, könnte durch sukzessive Sekretabgabe eine allmähliche, strukturelle Veränderung der Eihülle erfolgen, die der fertig ausgebildete Fisch zum Schlüpfzeitpunkt nur noch zerreißen müsste.

Die in den Experimenten verwendeten Forelleneier wurden in der früher beschriebenen Weise aufgezogen² und mit Glutaraldehyd (6% in 0,1 M Phosphat-Puffer, pH 7,2) im Alter von 0,2, 4,8, 15, 19 und 23 Tagen fixiert. Die Ein-

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² H. E. HAGENMAIER, Wilhelm Roux' Arch. EntwMech. 162, 19 (1969).