THE DISCOVERY OF THE OESTRUS CYCLE IN MAN AND OTHER MAMMALS

THE cyclical changes which take place in the uterus and the vaginal mucosa of mammals have been studied in detail within the last few years. This work received its principal impetus from the reports of Stockard and Papanicolaou[1] and of Long and Evans[2], both of which are dealing with the rat. Since then various other mammals have been investigated and Dierck[3] and others have discussed the phenomena of the oestrus cycle in the human female. The importance of this work is generally acknowledged. It should, therefore, be of some interest to call attention to early work in this field which seems to be but little known. F. A. Pouchet, in his work, "Théorie positive de l'ovulation spontanée et de la fécondation des mammifères et de l'espèce humaine, basée sur l'observation de toute la série animale," published in Paris in 1847, gave a rather detailed account illustrated by three plates, of observations which he had made upon smears from the uterus and vagina of human females and sows. He definitely recognized the regular cyclical character and the physiological importance of these phenomena. The only reference to Pouchet's book which the writer has seen in the recent literature concerning the oestrus cycle was found in the monograph by Long and Evans. Since these authors, however, refer to Pouchet only as authority for spontaneous ovulation, and since they state that the first description of changes in the vaginal mucosa was given by Morau in 1889, it may be inferred that they had not seen Pouchet's original book.

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CHROMOSOME NUMBERS IN ULMUS

THE first report on chromosome number in this genus was by Krause in 1929. He reported fourteen chromosomes as the haploid number for *Ulmus montana* With. In some unpublished work Krause has reported that the haploid number of chromosomes for *Ulmus americana* L. is 14 and for *U. campestris* L. is 14+.

Flower buds of *Ulmus pumila* L., *U. fulva* Michx., and *U. americana* L. were collected during the spring of 1931. Belling's aceto-carmine method was used to determine the stage in development of the buds at which division figures appeared. Fixations were made of such material, and chromosome counts were made from polar views of equatorial plates of both heterotypic and homeotypic divisions. It appears that the haploid chromosome number of *U. pumila* and of *U. fulva* is fifteen and that that of *U. americana* is twenty-eight or thirty. The apparent variation in the case of *U. americana* may possibly represent a difference between individual trees.

A study of the chromosomes in somatic cells is planned as well as a more detailed study of the chromosomes during meiosis.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

PHOTOMICROGRAPHY WITH A VEST POCKET CAMERA

THE method of adapting a box camera for photomicrography given in a recent issue of SCIENCE[1] by Mr. Apgar suggests a simpler solution of the problem which I used some time ago.[2] A vest pocket kodak can be used to make photomicrographs by setting it over the ocular of the microscope without additional focusing apparatus. The series with the f. 6.9 lens in a focusing mount fits the ocular very well, as the rolled edge of the microscope ocular makes a light-tight connection with the lens mounting, and the camera is so balanced that no additional support is needed. The manufacture of this very useful kodak has been discontinued, but it may be obtained for a nominal sum from dealers having second-hand kodaks. Other cameras of similar size may also be used.

When the draw tube of the microscope is extended to the proper distance of 160 mm (Leitz 170 mm) and the microscope focused sharply with the normal eye or with an eye properly fitted with spectacles a sharp picture may be obtained when the camera lens is set at infinity. If the draw tube is not extended to the proper distance a minus lens of the proper focal length must be placed over the eyepiece when the microscope is focused but removed before the camera is placed on the microscope.[3] Having the draw tube closed prevents any slipping due to the weight of the camera and does not greatly reduce the definition of the microscope. With one microscope that I used in this way, a –9 dioptera lens gave the necessary correction. The actual amount of correction needed will depend on the instrument used, so the above

[1] *American Journal of Anatomy*, Vol. 22, 1917.

[2] "Memoirs of the University of California," Vol. 6, 1922.

[3] Archiv für Gynäkologie, Vol. 130, 1927.

[1] C. E. Apgar, SCIENCE, 74: 487–8, 1931.

[2] O. W. Richards, *Bot. Gaz.*, 86: 93–101, 1928.

[3] This suggestion comes from Foot and Strobel, quoted by M. F. Guyer in "Animal Micrology," p. 150, Chicago, 1921.

figures merely indicates the approximate magnitude of required lens.

It is preferable to use the microscope at the proper tube length for the greatest definition, and this can be done if a rubber ring cut from a piece of rubber hose is placed around the draw tube to prevent telescoping from the weight of the camera. Many modern microscopes have the draw tube fixed at the proper length, so no additional friction is needed.

The use of the vest pocket kodak with the autographic feature allows permanent labeling of the negatives, which can not be done with the box camera. The magnification obtained will depend on the lens on the camera and the distance from the lens to the film. It can be obtained easily by photographing a stage micrometer. When it is desirable to reduce the cost of the negative film an insert can be made to reduce the opening in the back of the camera, cut from the thin aluminum of an ordinary cookie tin, and less expensive moving picture film used. The distance that the film is to be turned ahead between pictures can be noted by extending the opening on the back of the camera to the edge of the film and counting the perforations of the film through a red window as the film is wound. The disadvantage of this method is that the camera must be loaded and unloaded in the dark room or in a changing bag. In the previous work[2] I used an insert with an opening of 1 x 1½″, which is twice the size of the cinema frame and thereby reduced the cost of the negatives to about one cent per exposure.

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A NEW TECHNIQUE FOR OBTAINING OOSPORES OF THE HOP DOWNY MILDEW BY INOCULATING COTYLEDONS

FIELD observations in the Fraser Valley, British Columbia, in 1930, showed that young hop seedlings were badly infected with the hop downy mildew, *Pseudoperonospora Humuli* (Miy. and Tak.) Wilson. Cotyledons and primary leaves were covered with conidiophores bearing conidia.

Following this observation hop seed were gathered from plants of the clusters variety and sown in flats in the laboratory in 1931. As the cotyledons and young primary leaves appeared, they were inoculated by placing on them minute portions of infected leaves obtained from diseased "basal spikes." The seedlings had been previously moistened. The seedlings were afterwards covered with vials so as to maintain maximum humidity. They were grown in the basement of the laboratory, where the temperature remained fairly constant at 58° to 65° F. The seedlings were moistened with water each day.

After a period of six days, the time varying with different seedlings, it was noticed that the cotyledons showed signs of "damping off." Microscopic examination of the cotyledons showed that no conidiophores had developed, but on teasing out the tissue, it was found that oogonia and oospores were present in abundance. Approximately eighty oospores were found in each cotyledon, giving an average of 160 oospores per seedling. The oospore dimensions corresponded with those reported by other workers, ranging between 23 and 37 μ. Further work revealed that when maximum humidity was not maintained, conidiophores bearing conidia were produced, as well as oospores.

At present it is possible to collect abundant oospore material by inoculating hop seedling cotyledons in the manner described and gathering the latter when they show signs of damping off. By this method it will also be possible to obtain conidia for experimental purposes in the greenhouse during the winter period.

The writer considers that this technique of inoculating cotyledons may be applicable to other members of the Phycomycetes, which means a great saving of time for the worker who wishes to examine oospore material within the host.

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SPECIAL ARTICLES

ON THE VARIATION OF THE OXYGEN CONTENT OF CULTURAL SOLUTIONS

EARLIER observations led to the conclusion that there may be a translocation of oxygen from the shoot to the root of plants when the shoot is in sunlight and the root is in soil.[1] The present note records observations, to be published in detail elsewhere, that a similar movement of oxygen may take place when the roots of plants are in cultural solutions, particularly in distilled water.

The plants referred to are willow, cotton, corn and sunflower. These were grown in a standard culture solution and were transferred to distilled water for

[1] W. A. Cannon, "Studies on Roots," Carnegie Institution of Washington. Year Book No. 25, p. 317, 1925–26.

The investigation was carried on in part with the aid of a grant from the American Association for the Advancement of Science.