

AUCKLAND BOTANICAL SOCIETY

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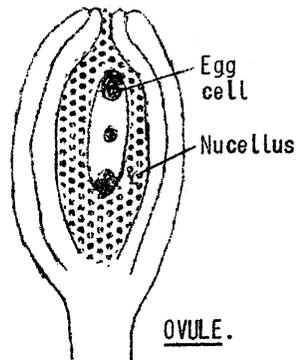
On Wednesday, August 1st, the Society met at 8 o'clock to find the lecture table festooned with various branches of New Zealand grown citrus trees, all adorned with succulent fruit from mandarins to pomelos. Our lecturer, Dr. Mowat, head pomologist, Plant Diseases Station, Mt. Albert, had recently returned from a three years' study of citrus culture in America, and consequently was able to give us an informed account of modern developments in the citrus industry there. In discussing citrus breeding, he dealt at some length with nucellar embryony.

Below we publish a simple line drawing of an ovule (magnified) showing the embryo sac with its egg cell, surrounded by the tissue of the nucellus. Usually the embryo develops from the fertilised egg cell, but sometimes embryos will develop from other cells of the embryo sac, from the nucellus, or from the inner integument that surrounds the nucellus.

Dr. Mowat has been kind enough to forward to us the following interesting notes on his lecture.

NOTES ON NUCELLAR EMBRYONY IN CITRUS

In the seed formation of most varieties of Citrus and some closely related genera a rather unusual phenomenon occurs which is very interesting to botanists and of considerable practical importance to commercial citrus growers and breeders of citrus fruits. This phenomenon, known as nucellar embryony, is a development in the ovules of extra embryos which originate, not from division of the fertilized egg cell, but from cells of the nucellus of the mother plant. Pollination and probably fertilization appear to be a necessary stimulus for this occurrence. Shortly after fertilization, isolated cells of the nucellus increase in size, the



nuclei enlarge and the protoplasm becomes more dense. These cells divide, forming groups of cells which grow into the embryo sac, where they lie alongside the true or gametic embryo and soon are indistinguishable from it. Such embryos are known as nucellar embryos and may vary in number from one to more than 10. There is competition between the embryos for food supply, however, so that usually when a seed germinates, only two or three seedlings emerge. One of these may have developed from the gametic embryo and will therefore have genetic characters derived from both male and female parents. All the other seedlings, however, having originated from the somatic cells of the mother plant will be identical with it in genetic constitution, except for possible differences arising from mutations.

The gametic seedlings cannot be distinguished with certainty from the nucellars except where the male parent differs in appearance from the female and transmits this difference in some degree to the off-spring. Gametic seedlings originating from a cross between two closely related varieties or from selfing are often lacking in vigour. In a population of seedlings of this type, therefore, if all variant types and all the smaller seedlings are removed, we can expect to have a very high percentage of nucellar seedlings remaining. If all the seed came originally from one tree, then these nucellar seedlings are as uniform in their genetic make-up as if they had all been propagated from a single individual by cuttings. Citrus nurserymen use these methods in growing a uniform line of stocks for budding. They, therefore, have a great advantage over apple and stone fruit nurserymen, who have to raise most of their clonal stocks by more laborious methods from cuttings, layers or stools.

Citrus trees are subject to several virus diseases, many of which are serious. It is a curious and as yet unexplained fact that in the process of embryo formation the virus that must have existed in the nucellar cells of an infected plant appears to be eliminated and the nucellar seedlings are completely free from virus disease. This allows the citrus grower to regain a healthy strain of some valuable variety that has become debilitated owing to virus attack.

Nucellar embryony greatly complicates the work of breeders of citrus fruit, since if they are trying to cross varieties that resemble one another in vegetative characters, it is practically

impossible to sort out their cross-bred seedlings (the gametics) from the nucellars, except by growing all the plants through to the fruiting stage, a process that may take 20 years.

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FIELD WORK

Mrs. A.T. Wood, of Highland Road, Mt. Albert, has been the first of our members to send in a completed list of species accompanied by a collection of carefully preserved and named specimens, accompanied, for good measure, by a neat card index.

We have great pleasure in printing below a general account of Mrs. Wood's collecting activities, because in the first place we feel it will be both of use and interest to fellow collectors, and further, that it will provide valuable information for any of our members visiting the Huia region during the forthcoming summer months.

The thanks of the Society are due to Mrs. Wood for her enthusiasm as a collector and the painstaking care with which she has set her collection in order.

Following Mrs. Wood's general account of her field study, we publish a brief account by Miss Dingley of a comprehensive list of plants in the Silverdale area, collected by Mr. Bartlett and others, that has been kindly forwarded to us by Mr. E.D. Hatch.

THE HUIA AREA

"In 1949 it was decided by the Auckland Botanical Society that a 'Botany of Auckland' list should be compiled backed by specimens collected by individuals from certain specified areas. In undertaking a collection from the Huia area, I at first intended to collect only from the bay itself and the surrounding hills. However, on observing that the low scrub-covered promontory known as Wesley Spragg reserve contained several plants that are local, namely Dracophyllum squarrosum, Leucopogon Fraseri, Pomaderris phyllicae-folia, Pterostylis barbata, Pimelia prostrata, Hakea*acicularis, and H. pubescens,* I decided to include this area and so add more variety to my collection. The whole section covered is fairly large, commencing from the Kakamatua Stream, extending along the seaward side of the road including Wesley Spragg reserve, Kaitarakihi Point, Huia Bay as far as Te Komoki or Jackie's Peak, and to the summit of the surrounding hills, the highest point arising to 1000 ft. above sea level.

* Introduced species.