

**THE USE OF COLCHICINE IN DETERMINING THE ORIGIN OF FOLIAR ORGANS IN THE WHEAT EMBRYO****MARCELOTTE LEAKE, University of Oklahoma, Norman****ABSTRACT**

There is considerable difference of opinion in botanical circles concerning the nodal arrangement in the wheat embryo. Avery (1930) holds that the vascular traces to the scutellum and coleoptile originate from the same node while McCall (1934) maintains that they arise from different nodes in the axis. Since colchicine treatment increases the size of cells through doubling the chromosome number, it is possible that such treatment would increase the length in this region of the embryo and clarify the morphological situation.

The chromosome number in wheat has been doubled with colchicine by Britten and Thompson, although their methods seem not to have been published. McCall's morphological investigation is concerned with Hard Federation wheat, a 48-chromosome variety. In this study the perfection of the method of colchicine treatment was begun on a diploid variety of durum wheat, with 14 chromosomes. Two methods of treatment were used, viz., one sample of seeds was germinated on filter paper soaked with a 1.25 percent colchicine solution in a petri dish and another sample was soaked in water 8 hours and then transferred to filter paper soaked with 1.25 percent colchicine solution in a petri dish, left for 24 hours and transferred to a water soaked filter paper. In both methods the percentage of germination was 60 percent. The controls germinated with water only gave 90 percent germination.

In order to determine the effectiveness of the treatment, 10 seedlings were fixed with F.A.A. solution (5 parts formalin + 5 parts acetic acid + 90 parts 70 percent ethyl alcohol) at regular intervals during the germination of the controls and treated samples. At the end of the 56-hour germination period, the seedlings were planted. Both treated and untreated plants matured grain.

Examination of the seedlings that were fixed and sectioned showed that the large parenchyma cells at the base of the coleoptile were 25 to 50 percent larger in the treated seedlings than in the untreated seedlings. The embryos stained heavily with safranin to the base of the coleoptile, indicating that the colchicine had penetrated that part thoroughly. A 0.65 percent colchicine solution should, therefore, yield a satisfactory number of tetraploid seedlings.

The tetraploid seeds produced have not yet been germinated and examined to see if any axis elongation results in induced tetraploidy and if so, whether the nodal situation can more easily be interpreted.

**LITERATURE CITED**

1. Avery, G. S., Jr. 1930. Comparative anatomy and morphology of embryos and seedlings of maize, oats, and wheat. *Bot. Gaz.* 89: 1-39.
2. McCall, M. A. 1934. Developmental anatomy and homologies in wheat. *Jour. Agri. Res.* 48: 283-321.