188. On the Occurrence of the Haploid, Triploid and Tetraploid Plants in Twin Seedlings of Common Wheat.

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(Comm. by S. IKENO, M.I.A., Dec. 12, 1934.)

In the wheat breeding experiments conducted here during 1933-34 the writers have met with many twin seedlings of common wheat, *Triticum vulgare* Host. (Fig. 5), of which 29 pairs found among the F_3 and F_4 progenies derived from certain intervarietal crosses were to be noticed in this paper. For the purpose of their study each seedling of every pair was planted separately in the Wagner's pot, and it was observed that in 10 cases out of 29 in all the two sister plants grown out from the twin seedlings of any one pair differ from each other not only in their external form and the degree of fertility, but also in their karyological respect. As it was for the writers too late to make the cytological study of the microsporogenesis, they have examined karyologically the root-tip cells of these plants, which were fixed in Benda's solution and stained with iron-alum haematoxylin. It is very remarkable that the counting of the chromosome number in the metaphase of their nuclear division has given the following results:

19 cases.....both plants of a pair diploid ($2n=42$)
(Fig. 2)

1 case one plant haploid ($n=21$) (Fig. 1)
and another diploid

1 case one plant tetraploid ($4n=84$) (Fig. 4)
and another diploid

8 cases.....one plant triploid ($3n=63$) (Fig. 3)
and another diploid

The characters of the haploid, triploid and tetraploid plants just indicated are as follows, as compared with those of the normal (diploid) plant (Fig. 6-9):

Fig. 5.

Twin seedlings,
diplo-tetraploid. n,
diploid plant; te,
tetraploid plant.

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Figs. 1-4. Somatic metaphase in one of the twin seedlings. 1, haploid (n or $3x=21$) plant. 2, normal ($2n$ or $6x=42$) plant. 3, triploid ($3n$ or $9x=63$) plant. 4, tetraploid ($4n$ or $12x=84$) plant. ($\times 1600$).

	Haploid plant	Triploid plant	Tetraploid plant
Leaf	narrower and shorter	nearly the same	little broader
Culm	thinner	nearly the same	thicker and shorter
Ear	shorter and thinner	little shorter	little shorter
Number of ears ...	greater	fewer	fewer
Awn	shorter	shorter	little shorter
Fertility	2%	10 (0.4-47.2) %	80.5%

The haploid plant of common wheat has been recently reported by Yamasaki³⁾ (1934); our haploid plant differs from his, inasmuch as in the former the culms are more numerous than in the normal case, and besides no abnormal spikelets are seen in late tillers.

Fig. 6.

Fig. 7.

Fig. 8.

Fig. 9.

Figs. 6-9. The two plants which are grown from twin seedlings. n, normal plant. h, haploid plant. tr, triploid plant. te, tetraploid plant.

The tetraploid plant represented in Fig. 5 is derived from a much shorter and thinner seedling than in the normal one, so that the above description of the tetraploid might be somewhat different, if it were grown out from a normal-sized seedling.

Though the percentage of the occurrence of twin seedlings among the whole plot was exceedingly small (0.05%), that of the occurrence of the haploid, triploid and tetraploid plants among the twin seedlings is comparatively high (s. the table below).

Occurrence of the haploid, triploid and tetraploid plants
in twin seedlings in F_3 and F_4 .

	Number of chromosomes in each twin				Total
	42-42	42-21	42-63	42-84	
Number of twin seedlings	19	1	8	1	29
Percentage	65.6	3.4	27.6	3.4	100
	65.6		34.4		100

Similar results as above were got by the writers in their later experiments on the variety "Sintyûnaga."

Ramih, Parthasarathi and Ramanujam²⁾ (1933) have reported the occurrence of one haploid plant in the twin seedlings of the rice plant, while Kappert¹⁾ (1933) has observed the formation of the diplo-haploid twin from polyembryonic seeds of flax.

References.

- 1) Kappert, H.: Erbliche Polyembryonie bei *Linum usitatissimum*. Biol. Zbl. **53**: 276-307, 1933.
- 2) Ramih, K., Parthasarathi, N. and Ramanujam, S.: Haploid plant in rice (*Oryza sativa*). Current Sci. Mysore **1**: 277-278, 1933.
- 3) Yamasaki, Y.: The haploid plant of common wheat, *Triticum vulgare*, Host. Cytologia **5**: 305-307, 1934.