

'Coloured Anthers': a New Monofactorial Character in Wheat, *T. vulgare*, Host.

In most bread wheats the anthers are yellow but in occasional lines they are a characteristic purplish-pink colour. During some experiments with hexaploid or *vulgare*-series wheats a cross was made between a yellow-anthered spelt wheat, *Triticum spelta*, L., and a coloured-anthered bread wheat, *T. vulgare*, Host. (*T. spelta* is simply a variety of *T. vulgare* with the '*spelta*' gene or gene block K^s on one of the pairs of chromosomes of the A or B sets instead of the allelomorph k for the round type of glume of *T. vulgare*). Of the F_2 plants examined at anthesis, 28 had coloured anthers (*CaCa* or *Caca*) and 13 had yellow (*caca*).

Anthers	Observed (O)	Calculated (C)	O-C	(O-C) ²	$\frac{(O-C)^2}{C}$
Coloured	28	30.75	-2.75	7.56	0.246
Yellow	13	10.25	2.75	7.56	0.785
Total	41	41.00	0.00	$\chi^2 = 0.981$	

With $\chi^2 = 0.981$, for 1 degree of freedom, $P = 0.5-0.3$, showing a good agreement with a 3:1 ratio.

After harvest, of the 41 plants classified, for various reasons only 34 remained which could be classified with respect to the spelta/round glume characters. Classification was not easy as the parental bread wheat line is one which itself has a slightly keeled glume. However, the following results were obtained:

Class	Observed (O)	Calculated (C)	O-C	(O-C) ²	$\frac{(O-C)^2}{C}$
Coloured keeled	17	19.125	-2.125	4.52	0.236
Coloured round	6	6.375	-0.375	0.141	0.022
Yellow keeled	10	6.375	3.625	13.14	2.062
Yellow round	1	2.125	-1.125	1.27	0.596
Total	34	34.00	0.000	$\chi^2 = 2.916$	

With $\chi^2 = 2.916$, for three degrees of freedom, $P = 0.5-0.3$, showing a good agreement with the assumption that the coloured/yellow anther alleles (*Ca/ca*) are monofactorial and independent of the keeled/round glume factors (K^s/k), giving a 9:3:3:1 ratio in the F_2 .

The number of simply inherited characters in wheat is remarkably small, so that the present one, which does not appear to have been described before, may prove useful as a marker gene. That other types of coloured anthers may give 15:1 or 63:1 ratios is quite possible since multiple factors are common in wheat: the character described might well be only one of two or three such allelomorphs.

Classification is good but inconvenient unless the plants can be grown where they may be examined every day. At anthesis there is little difficulty in classifying a plant, though sometimes (in heterozygotes?) the colour is pale or restricted to the base of the anthers. After shedding pollen, the anther seems to continue drying and become a dirty white colour indistinguishable from that of an old dehisced yellow anther. Thus classification must be done during anthesis. The temperature during development seems to be rather important—all the F_1 plants were grown in a greenhouse, and they, as well as plants from similar crosses and plants from the line of the coloured parent, all had yellow anthers. The F_2 was grown outside, and the cool summer of 1944 was favourable for the expression of the character in these plants and in the parental and similar lines.

Thus the character 'coloured anthers' offers a new allele which, at least in this case, is easily classifiable, is monofactorial and is independent of the keeled/round glume allelomorphs.

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Shape of Sea-Urchins

In the latest edition of "Growth and Form" (1942), Sir D'Arcy Thompson has directed attention to the analogy between the shapes of drops of such a liquid as *ortho*-toluidine when resting on the bottom of a vessel filled with water, and the shapes of sea-urchins. Thus a small drop remains practically spherical while a large drop spreads itself out, or more or less sags under its own weight (pp. 946-48).

In this way, Sir D'Arcy Thompson seeks to account for the pronounced flattening of some of the sea-urchins while he attributes the marked conical shape of others to the presence of masses of *fatty, oily eggs*, which have a density less than that of sea-water and thus raise the upper surface.

Some recent work carried out at Plymouth, however, would indicate that both these concepts require revision.

It is not denied that a sea-urchin with a very flexible shell might become flattened under its own weight, but flattening does not necessarily imply a non-resisting shell.

One of the sea-urchins recently studied was *Psammechinus miliaris* (Gmelin), which was found to have a density of 1.3457 at 14° C. and to contain 55.5 per cent water. The figures represent the mean of four determinations. One of the chief characteristics of this urchin is its marked flattening, its height seldom exceeding half the diameter. The urchin is, however, remarkably resistant to weight. This was proved by the very simple experiment of placing a specimen, after it had drained on filter-paper for a few seconds, under the right-hand pan of a 5 kilo Oertling balance. Weights equal to 4 kilos were placed on the left pan and two weights each of 2 kilos were placed on the right pan.

On removing the weights carefully from the left pan the right pan rested on the urchin, and it was found that the animal could support the whole 4 kilos without undergoing injury, and since the urchin in question only weighed 19 gm. it was thus supporting more than two hundred times its own weight.

The second concept, namely, that of the upper part of the shell being raised by the presence of ova lighter than sea-water, also requires moderation, for the ova of sea-urchins contain very little fat and at no period of their existence is their density less than that of sea-water. The whole concept of buoyancy by oil drops in sea-water requires revision, for though such oil drops are fairly common their density is usually about 0.9. Thus in marine invertebrates, if the density of calcite is 2.7 and that of silica 2.5, that of chitin 1.4 and of protoplasm itself 1.05, the presence of a small amount of oil or fat with a density of 0.9-0.8 can have very little buoyancy effect. It is very doubtful whether any appreciable buoyancy effect due to fats or oils is to be found except among