A GENETICALLY CONTROLLED BLOTCH ON BEAN FLOWERS

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According to Lamprechth (1), color in flowers of *Phaseolus vulgaris* L. requires the presence of the basic gene *P* (which is also basic for seed coat color) and the gene *T* (which controls the uniform distribution of seed coat color). Individuals of the constitution *pp* and *tt* have white flowers. In the presence of *P* and *T*, specific flower color depends on a series of at least 3 multiple alleles which are in order of dominance: *v* (violet), *pV* (pink), and *v* (white).

Intensification of color on the terminal border of the standard was studied by Lamprechth (1, 2). Its genetic nature is complex, involving the action of at least 7 different genes, all in the dominant condition.

'Rico-23', a black field bean variety described by Vieira (5), possesses violet flowers with a brownish-violet blotch on the base of the standard (Figure 1). Inheritance studies of these 2 characters in two *Phaseolus vulgaris* crosses involving Rico-23 are presented in this paper.

**Materials and Methods**

Rico-23 was crossed with each of 2 varieties with white flowers and without the blotch at the base of the standard: 'Manteigão-Fosco-11' which has buff seeds, and 'White Kidney 4306' which has white seeds. The populations were grown and scored in the field at Vicosa, Minas Gerais, Brazil (21° S. latitude).

In both crosses the intensity of the blotch color was variable in the segregating generations, ranging from a light shade of brownish-violet to one of dark coloration as on the flowers of Rico-23. This variability has been observed under clear and cloudy weather. No attempt was made to classify these various shades.

**Results**

Cross of Manteigão-Fosco-11 × Rico-23. The *F₁* plants had violet flowers with the blotch. In the *F₂*, a 9:3:3:1 segregation ratio was observed (Table 1) indicating that flower color and the blotch character are inherited as independent factor pairs. The symbol *Mf* (from the Portuguese *mancha na flor = blotch on the flower*) is proposed to represent the dominant allele for the blotch character.

Cross of White Kidney 4306 × Rico-23. The *F₁* plants had violet flowers with the blotch. The *F₂* data (Table 1) indicate that flower color is inherited as a single factor character, giving 3 violet:1 white. The blotch, however, occurred in about 3/4 of the plants with violet flowers but was absent from plants with white flowers. The goodness of fit to the independent segregation ratio 9:3:4 has a *P* value of 0.20 or better. The results obtained in the *F₃* (Table 2) are in accord with the *F₂* data.

**Discussion**

Evidently, the gene responsible for the white flower color in White Kidney 4306 suppresses the manifestation of the dominant gene *Mf*. White Kidney has been shown by Smith (4) and Nakayama (3) to possess white flowers and white seeds due to the absence of the basic gene *P*. Therefore, the data in Tables 1 and 2 indicate that White Kidney 4306 has a genotype *pp VV mfmf*, Rico-23 has *PP VV MfMf* and that *Mf* is manifested only in the presence of the basic factor *P*. White Kidney as used by Nakayama in his genetic studies had the constitution *pp mfmf*.

Manteigão-Fosco-11, possessing a uniformly colored seed coat and white flowers but lacking the blotch, has the genotype *PP TT vv mfmf*. Crosses with Rico-23 give independent segregation between the 2 pairs of alleles *Vv* and *MfMf* in a ratio of 9:3:3:1 due to the presence of *P*.

**Literature Cited**


