EVALUATION OF SEED-Fe CONCENTRATION IN DRY BEAN

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Introduction

Iron deficiency is a serious public health problem, affecting approximately two billion people throughout the world (Della Pena,1999). Due to its substantial iron content the common bean plays an important role among foods (Pennington and Young, 1990). Highly consumed by populations in Latin American and African countries, common bean is one of the main sources of protein, calorie and iron for these populations. Thus, issues related to improving the nutritional quality of foods, such as the common bean, should be addressed genetically through plant breeding programs (Koehler and Burke, 1981).

Material and Methods

The experiment was carried out during 2003 spring, in the green house of University of Londrina, Paraná, Brazil. Two cultivars Ruda and Perola were used as females, and Xamego, Rio Tibagi, IAC –Uma and FT Nobre were used as males.

After the harvest, the pods were hulled to obtain the seeds that were placed separately (by plot) in a stove with forced air circulation, at 50º- 55ºC and dried until constant weight was reached. After drying, the material was grounded in a rotating mill and sieved through a 1 mm mesh. Three 400 mg samples were then weighed from each experimental plot and nitroperchloric digestion was performed until the samples were lightened. Each sample was then diluted in distilled and deionized water up to a 100 ml. A representative aliquot was taken from this sample and the iron present in the ground bean grains was quantified by an atomic absorption spectrophotometer.

Results and Discussion

Genetic variability for iron content was observed in the common bean seeds (Table1). There was favorable complementation of alleles, therefore the averages of the iron concentration in the seeds from the crosses were greater than the averages of the respective parents (Table1 and 2). In the general combination, Rudá was the parent that provided the best average in all the crosses, when compared with Perola (Table 2 and 3). It is important to consider that Rudá was derived by crossing of Carioca with Rio Tibagi. In the specific combination, Rudá and Rio Tibagi produced highly favorable effect, raising the average of the F2 population (Table 2 and 3).

Table 1. Means of Seed-Fe concentration (mg $100g^{-1}$) in dry bean parents grown at Londrina-PR. Brazil, in 2003

Genotype		Seed-Fe Concentration (mg $100g^{-1}$)
Males	Rudá	12.4
	Pérola	10.4
Females	Xamego	6.8
	Rio Tibagi	5.5
	IAC-Uma	5.1
	FT Nobre	6.2

Table 2. Means of Seed-Fe concentration (mg $100g^{-1}$) in F2 population derived from dry bean crosses at Londrina-PR. Brazil, in 2003.

Genotype	Xamego	Rio Tibagi	IAC-Uma	FT Nobre	Means
Rudá	10.6	13.4	9.5	11.2	11.2
Pérola	9.5	10.3	9.7	9.7	9.8
Means	10.1	11.9	9.6	10.5	10.5

Table 3. Heterosis means of Seed-Fe concentration in F2 populations derived from dry bean crosses at Londrina-PR. Brazil, in 2003.

Genotype	Xamego	Rio Tibagi	IAC-Uma	FT Nobre
Rudá	1.00	4.45	0.75	1.90
Pérola	0.90	2.35	1.95	1.40

Conclusions

It is possible to increase iron concentration through breeding.

It was demonstrated that there was genetic variation in iron content among bean seed genotypes with a favorable complementation of the alleles.

'Rudá' was the parent that raised the average effect the greatest and when crossed with 'Rio Tibagi', produced a highly favorable effect.

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