

## Grain legume as a complete source of food and feed



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### ABSTRACT

Legumes are a convenient source of food, feed and pharmacologically active substances. Here we present results of the chemical composition of seeds of two under-studied legume species – bitter vetch (*Vicia ervilia* (L.) Willd. ) and birdsfoot trefoil (*Lotus corniculatus* L. ). Seed samples are collected and stored in the genebank of Institute of Plant Genetic resources – Sadovo. Plants were propagated in the IPGR nursery with the respective agrobiological characterization. Collected seeds were analyzed for content of proteins, soluble sugars and starch, amino acids, phenols, flavonoids, antitrypsins. Results contribute for characterization of plant diversity and provide valuable information for breeders and potential users.

**Key words:** bitter vetch, birdsfoot trefoil, feed, landraces, seed composition

### RESULTS

**Table 1.** Variability of metabolites in *Vicia ervilia* L. accessions

№	BGR/Cat. number	Soluble sugars mg.g <sup>-1</sup>	Starch mg.g <sup>-1</sup>	Phenols mg.g <sup>-1</sup>	Flavonoids mg.g <sup>-1</sup>	Amino acids mg.g <sup>-1</sup>	Trypsin - activity
<i>Vicia ervilia</i>							
1	BGR3051	35.55	561.75	0.21	0.27	0.032	2.224
2	BGR3052	34.60	525.63	0.26	0.33	0.055	2.387
3	BGR6207	33.55	615.00	0.26	0.36	0.038	1.699
4	BGR13526	49.68	627.75	0.33	0.83	0.044	1.220
5	B9E0168	35.43	565.50	0.21	0.25	0.053	2.178
6	A3BM0178	28.73	571.13	0.22	0.24	0.033	1.967
	Mean	36.26	577.79	0.25	0.38	0.04	1.95
	Min	28.73	525.63	0.21	0.24	0.03	1.22
	Max	49.68	627.75	0.33	0.83	0.06	2.39
	VC%	19.43	6.50	18.61	59.31	23.28	21.7



*Lotus corniculatus* L.

**Table 2.** Variability of metabolites in *Lotus ornicolatus* L. accessions

№	BGR/Cat. number	Soluble sugars mg.g <sup>-1</sup>	Starch mg.g <sup>-1</sup>	Phenols mg.g <sup>-1</sup>	Flavonoids mg.g <sup>-1</sup>	Amino acids mg.g <sup>-1</sup>
1	BGR3577	6.75	116.250	1.093	1.788	0.265
2	BGR3578	5.00	120.125	1.045	1.515	0.527
3	BGR3581	5.80	75.000	1.263	1.878	0.480
4	BRG3582	8.95	106.000	1.253	2.195	0.740
5	BRG3583	6.70	97.125	1.305	2.220	0.330
6	BRG3586	4.78	100.125	0.936	1.305	0.615
7	BRG3587	9.70	103.750	1.303	2.733	0.583
8	A6E0075	6.40	108.625	1.123	2.045	0.435
9	A8E0053	8.05	119.125	1.283	2.265	0.540
10	C1E0079	12.40	179.000	1.330	3.250	0.232
11	C1E0082	5.65	138.125	1.050	1.693	0.399
	Mean	7.29	114.84	1.180	2.081	0.468
	Min	4.78	1.180	2.081	0.468	1.180
	Max	12.40	0.936	1.305	0.232	0.936
	VC%	31.63	1.330	3.250	0.740	1.330



*Vicia ervilia* (L.) Willd.

**Table 3.** Mean performance of 6 *Vicia ervilia* genotypes in respect of different studied quantitative traits

Accessions	Mean value of plant height, cm	Mean value of height to the first pod	Mean value of number of basal branching	Mean value of number of productive pods per plant	Mean value of number of grains per pod	Mean value of number of grains per plant	Mean value of the mass of grains per plant	Mean value of pod size		Mean value of 100 grains mass, g	Mean value of harvest index,
								Length, mm	Width, mm		
BGR3051	50.67 bc	30.67 c	1.17 ab	32.83 a	2.10 a	55.00 a	1.10 a	12.47 a	3.90 a	2.20 a	11.26 a
BGR3052	49.98 bc	28.13 bc	3.60 d	25.50 a	2.75 b	49.56 a	1.16 a	14.22 b	3.86 a	2.55 b	19.75 b
BGR13526	46.83ab	24.63 ab	3.43 d	41.42 a	2.79 b	63.29 a	2.34 ab	17.56 de	4.45 b	3.80 c	24.13 bc
A3BM0178	41.25 a	19.83 a	1.00 a	73.17 b	2.82 b	137.17 b	4.03 b	14.72 bc	4.28 b	3.31 d	37.21 d
B9E0168	64.17 d	30.83 c	1.67 bc	97.50 bc	2.88 bd	194.17 d	6.17 c	16.25 cd	4.15 ab	4.10 d	26.39 c
BGR 6207	57.00 cd	24.00 ab	2.00 c	104.50 c	3.28 d	226.33 d	8.98 d	18.77 e	4.35 b	4.03 d	41.13 d

**Table 4.** Mean performance of 11 *Lotus corniculatus* genotypes in respect of different studied morphological traits

Number by order	Catalog №/origin	Number of days to germination	Days to mass flowering	Growth habit	Bush width (cm)	Plant height (cm)	Number of days to seed maturity
1	Standard - variety Targovishte	13	36	erect	15.4	54.8	146
2	Variety Viking	12	43	erect	17.4	63.2	118
3	K-30	14	57	erect	20.0	53.0	147
4	Variety Leo	7	76	semi-erect	20.0	63.8	156
5	Local form village of Kaleitsa	12	36	semi-erect	18.4	48.6	150
6	C1E0084	19	36	semi-erect	14.4	68.2	143
7	C1E0083	12	50	lying down	14.2	83.8	150
8	Local form village of Staro Selo	30	36	erect	21.0	62.8	131
9	B9E0208	24	43	erect	16.8	60.0	137
10	B9E0084	7	36	semi-erect	23.6	51.2	155
	Mean	15	44.9		18.1	60.9	143.3
	min	7	36		14.2	48.6	118
	max	30	76		23.6	83.8	156

### CONCLUSIONS

Overall, bitter vetch and common birdsfoot trefoil seeds have a high nutritional value and could be successfully used as a valuable source of food and feed. Based on metabolites several accessions were distinguished as the best from all studied genotypes: from *Vicia ervilia* L. collection – one accessions (BGR13526); from *Lotus corniculatus* collection - two genotypes (C1E0082 and BGR3578). Based on agro-morphological assessment several grain legume accessions were distinguished as the best from all studied genotypes: from *Vicia ervilia* L. collection – three accessions (A3BM0178, B9E0168 and BGR 6207); from *Lotus corniculatus* collection - two genotypes (variety Viking and B9E0208).

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