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CONSERVATION OF GENETIC DIVERSITY IN THE *SOLANACEAE* FAMILY IN BULGARIA

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Abstract
Conservation of plant biodiversity is a priority of the activity in IPGR – Sadovo. Annually accessions from the international centers of genetic resources are introduced, studied and maintained. Expeditions in different geographical region of the country are conducted and local varieties are collected. During the period 1978 – 2012 the National collection was enriched with 3398 local and introduced accessions from the *Solanaceae* family, including tomato (1149), pepper (2073) and eggplant (176). All accessions are registrated by passport data in the National register according to the international standards of FAO, ECP/GR and Bioversity International. Evaluation characteristics from the investigations are stored in databases by international descriptors of IPGRI. Trait collections for earliness, disease resistance, high content of biochemical indices and good taste qualities in favor of breeding programs were created. 55% of accessions in the collection are submitted for long term storage at the National Genebank.
Key words: plant genetic recourses, *Solanaceae* collection, evaluation, documentation, storage

INTRODUCTION

Conservation of plant biodiversity is a priority of the activity in IPGR – Sadovo. This is the first scientific center in Bulgaria, established 130 years ago, where accessions from local and foreign germplasm were collected and conserved. (Krasteva et al., 2010) Annually accessions from the international centers of genetic resources are introduced, studied and maintained. Expeditions in different geographical region of the country are conducted and local varieties are collected. The IBPGR methodology for collecting of local genetic resources was adapted for Bulgarian conditions. (Krasteva et al., 2008)

The subject of the investigation is to show the status of *Solanaceae* genetic recourses, included in the Bulgarian National Collection and to create traits collections by morphological, phonological and agronomic characterization, according to breeding needs.

MATERIAL AND METHODS

During the period 1978 – 2012 the National collection was enriched with 3398 local and introduced accessions from *Solanaceae* family, including tomato (1149), pepper (2073) and eggplant (176).

The evaluation includes three main stages: "preliminary" evaluation, "complex" evaluation and "special" evaluation. Preliminary evaluation is obligatory and is conducted in a quarantine field, where accessions are checked for diseases. Complex evaluation is the main source of information for documentation and is conducted according to the IPGRI Descriptors. All accessions have been characterized and the data from the investigations was stored in data bases, according to the European Program for Plant Genetic Resources. Special evaluation for the additional traits was conducted only for some accessions in breeding directions (Ganeva and Pevicharova, 2011; Krasteva et al., 2010; Todorova et al., 1997).

RESULTS AND DISCUSSION

The tomato collection

Tomato is the most common vegetable crop in Bulgaria. This is explained by its ecological plasticity, high fertility, multipurpose use and the biological value of the fruit.

Tomato genetic resources include six categories: introduced, currently used cultivars; new Bulgarian cultivars; old primitive cultivars, removed from the national cultivar list; local populations; wild relatives; and breeding lines (Table 1).

The introduced cultivars are the most important resources in terms of quality and represent the major part of the collection (706 accessions). Foreign introduced cultivars are originated mostly from USA, Germany, Canada and Israel. By expeditions were collected 290 local accessions from different geographical regions in Bulgaria.

The local populations are result from natural evolution and human interference through directed selection. Their great adaptability is due to their high genetic diversity and makes them particularly valuable genetic resources. Local forms are potential breeding sources for improvement of resistance to stress factors (diseases, pests and soil salinity).

The breeding lines are a special genetic stock used in the current breeding programmers. They in-

Table 1. Status of the National tomato collection

Species	Total	Introduced accessions	Expedition local materials	Selection cultivars	Long term storage
L. esculentum	1047	639	289	119	
L. pimpinellifolium	18	18			
L. hirsutum	6	6			
L. chilense	1	1			
L. humboldti	1	1			
L. annum	1		1		
Other Species	75	41		34	
Total	**1149**	**706**	**290**	**153**	**829**

Table 2. Tomato trait collection

Trait	Accessions/Catalogue numbers	Number of genetic sources
Earliness	*Determinate large fruit* 91602004, A4000027, B1000051 *Determinate small fruit* 91602047, A4000031, B1000092 *Indeterminate large fruit* A0000033, A9E0502, A9000407	**11** **9** **6**
High dry matter content	*Determinate large fruit* B0000128, A7000116, A4000058 *Determinate small fruit* A7000162, A4000030, A7000160 *Indeterminate large fruit* A9E0354, A9E0187, A9E0502	**13** **6** **12**
High vitamin C content	*Determinate large fruit* B000043, B000095, B000090 *Determinate small fruit* B1000042, B000084, A8E0386 *Indeterminate large fruit* A7E0923, A9E0502, A7E0179	**7** **15** **20**
High total acidity content	*Determinate large fruit* A7E0524, B1000052, A7E0372 *Determinate small fruit* B1000092, A2000144, A7000113 *Indeterminate large fruit* A9E0532, A9E0187, A9E0283	**15** **4** **13**
High sugar content	*Determinate large fruit* A4000045, B0000128, B000090 *Determinate small fruit* A8E0256, A8E0386, B1000092 *Indeterminate large fruit* A9E0187, A7E0530, A7E0307	**9** **9** **22**
Resistance to *Alternaria solani*	91602004, 91602011, 91602015, 91602028, 91602038, 91602039, 93602006, 94602004, 97602008, 97602011, A100005, A2BM003, A2BM004, A400034, A000006	**15**
Resistance to *Phytophthora infestans*	91602003, 91602016, 91602029, 91602032, 91602037, 91602047, 91602050, 91602051, 91602054, 91602057, 97602013, A1000060	**12**

Table 3. Status of the National pepper collection in Bulgaria

Species	Total	Introduced accessions	Expedition local materials	Selection cultivars	Long term storage
C. annuum L.	2043	494	1513	36	493
Wild species	30	30			
Total	**2073**	**524**	**1513**	**36**	**493**

Table 4. Pepper trait collection

Trait	Accessions/Catalogue numbers	Number of genetic sources
Earliness	*var. ratundum* B1E0045, B1E0059, B1E0061 *var. shipka* A7E0291, A7E0370, A7E0381 *var. kapia* B0E0342, B1E0041 *var.corniforme* B0E0301, B0E0305, B0E0337 *var. conoides* A7E0202, A7E0243, A8E0308 *var. cerasiforme* A7E0222, A7E0251, A8E0363	**7** **6** **2** **4** **5** **3**
Productivity	*var. ratundum* A7E0266, A7E0405, A8E0364 *var. shipka* A8E0383, A8E0118, A8E0635 *var. conoides* A7E0211, A7E0243, A8E0402 *var. cerasiforme* A7E0251, A8E0363, A8E0404	**3** **8** **6** **3**
High dry matter content	*var. ratundum* B0E0062, B0E0334, B1E0045 *var. shipka* A7E0278, A8E0574, A8E0618 *var. kapia* B0E0342, B0E0347, B1E0041 *var. corniforme* B1E0012, B0E0310, B0E0309 *var. conoides* A7Eo402, A8E0330, A7E0203 *var. cerasiforme* A7E0251, A8E0363	**8** **7** **3** **9** **7** **2**
High vitamin C content	*var. ratundum* B1E00062, B0E0328, B1E0045 *var. shipka* A7E0315, A7E0290, A8E0574 *var. kapia* B0E0342, B0E0347, B1E0041 *var. corniforme* B0E0309, B0E0305, B0E0310 *var. conoides* A7E0276, A8E0346, A7E0439 *var. cerasiforme* A7E0251, A8E0363	**10** **10** **3** **10** **10** **2**

Table 4. Continuation

High sugar content	*var. ratundum* B0E0328, B1E0062, B1E0045 *var. shipka* A8E0618, A8E0315, A7E0290 *var. kapia* B0E0342, B0E0347, B1E0041 *var. corniforme* B1E0012, B1E0019, B0E0309 *var. conoides* A8E0593, A8E0471, A7E0203 *var. cerasiforme* A8E0363, A7E0251	**6** **10** **3** **7** **7** **2**
Resistance to *Verticillium dahliae* (Kleb)	A7E0419, A7E0253, A7E0241, A7E0298, A8E0476, A8E0489; A8E0607	**7**

Table 5. Status of the Eggplant Bulgarian collection

Species	Total	Introduced accessions	Expedition local materials	Selection cultivars	Long term storage
S. melongena L.	176	138	34	4	26

Table 6. Eggplant trait collection

Trait	Accessions/Catalogue numbers	Number of genetic sources
Earliness	90603003, 92000145, 94000271, A8E0586, A8E0657, A2000146	**10**
Round-shaped fruit	85603008, A7E0313, A7E0312, 99603001, 85603020, 85603032	**8**
Egg-shaped fruit	85603010, 90603004, 93603003, A7E0430, A8E0658, 98603001	**8**
Cylindrical fruit	85603033, A3000356, A3000357, A4000060, A8E0602, 85603002	**15**
High dry matter content	94603004, 93603001, 94603005, 85603007, A7E0313, 87603001	**25**
High sugar content	A2000001, A2000145, A4000271, 93603002, 93603001, 90603010	**18**
High crude protein content	85603021, A4000269, 85603007, 85603033, 85603030, 85603024	**22**
Resistance to *Verticillium dahliae* (Kleb)	A8E0344, A8E0536, 85603030	**3**

clude accessions and lines of no economic value but possessing genes or combinations of genes with a definite breeding value.

Trait collections according to tomato breeding requirements for earliness, disease resistance, high content of biochemical indices and good taste qualities were created (Table 2).

The pepper collection

Pepper (*Capsicum annuum* L.) is one of the major vegetable crops in Bulgaria. In our country, pepper finds good conditions for its development, so that Bulgaria has become a secondary centre of origin.

The pepper collection consists of 2073 accessions, including 524 of foreign origin and 1513 accessions were collected during expeditions conducted in Bulgaria (1362), Albania (56), Serbia (49), Macedonia (46) and Bulgarian cultivars (36). Most foreign accessions are originated from Hungary, Russia, Germany, Japan and Israel. Few countries have at their disposal such a rich diversity of local forms (Table 3).

Trait collections according to pepper breeding requirements for earliness, productivity, high content of biochemical indices, good taste qualities and diseases resistance were created (Table 4).

The eggplant collection

Eggplant (*S. melongena* L.) is a traditional vegetable crop in Bulgaria. Through exchanges between the IPGR, Sadovo and related foreign institutes and some expeditions in the country, a collection of 176 eggplant accessions of was established (Table 5). The collec-

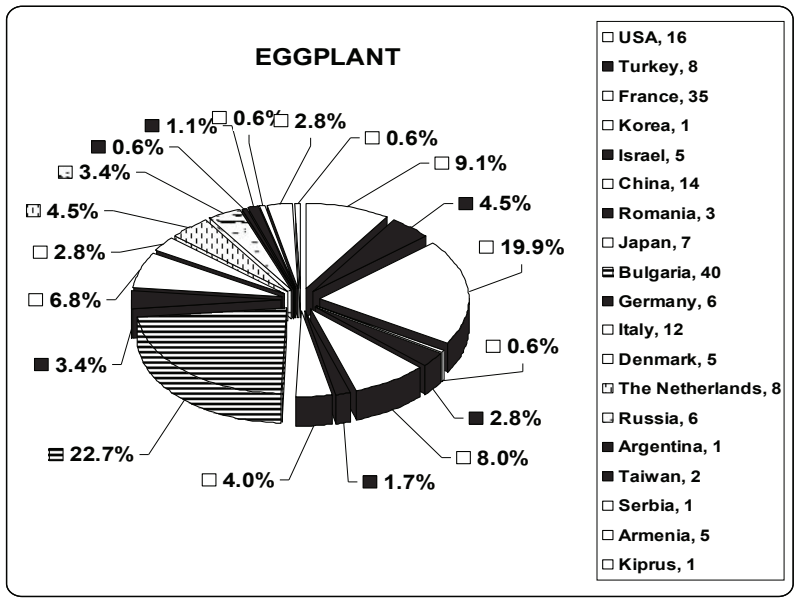

Fig. 1. Geographic origin of the eggplant accessions

tion comprises accessions from 19 countries (Figure 1). Most of them are originating from Europe and Asia. 34 local accessions were collected during expeditions in various regions of Bulgaria (Table 5).

Further to the evaluation of the collection and according to breeding needs, a trait collection was created for earliness, fruit shape, high sugar, crude protein, dry matter contents and disease resistance (Table 6).

CONCLUSIONS

Based on complex evaluation and continuous improvement of the trait collections new cultivars from the *Solanaceae* family were developed and registered by the Bulgarian cultivar list. Many accessions which exceed the standards for certain characters are given to the Vegetable Research Institute, Plovdiv for inclusion in new breeding programmers.

All accessions are registrated by passport data in the National Register PHYTO`2000 according to the international standarts of FAO, ECP/G and Bioversity International for documentation of plant genetic resources.

The *Solanaceae* collection is stored at the National Genebank of the Institute. Long-term conservation technology follows FAO/IPGRI standards. 55% of accessions are submitted for long term storage.

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