

COLLECTING PLANT GENETIC RESOURCES IN UPPER SVANETIA (GEORGIA, CAUCASUS MOUNTAINS) 2008

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Abstract

A joint exploration was carried out by staff members of the Botanical Garden and Institute of Botany, Tbilisi and the Leibniz-Institute of Plant Genetics and Crop Plant Research (IPK), Gatersleben, in August 2008 to study plant genetic resources in the isolated Caucasus region of Upper Svanetia, Georgia. In a very short time, restricted by the outbreak of the military conflict, 56 accessions, mainly of pulses, spices and vegetables could be collected. In several communities around the town of Mestia, still a large variability of traditional crop plants remains in cultivation. Even relic crops, such as *Panicum miliaceum*, *Pisum sativum*, *Lens culinaris*, and *Vicia faba* could be found.

Key words:

Caucasus, collecting mission, Georgia, plant genetic resources

Introduction

The territory of Georgia is very important for the study of plant genetic resources. It belongs to the Near Eastern region of diversity of cultivated plants (Vavilov 1935, Zeven and de Wet 1982). Several endemic taxa of cereals and legumes (*Triticum*, *Pisum*, *Vicia*) have been reported from this area (Hanelt and Beridze 1991). The ancient agricultural tradition can be documented by archaeological remains of crop plants from the 5th/6th millennium B.C. (Schultze-Motel 1989).

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Recent joint activities of the Tbilisi Botanical Garden and Institute of Botany and the Leibniz-Institute of Plant Genetics and Crop Plant Research (IPK), Gatersleben, continue the close Georgian-German cooperation in the field of plant genetic resources of the 1980s (Hanelt and Beridze 1991) as well as explorations in the frame of the project “Pharmaceutical values of onions and related species (*Allium* L.) of Middle Asia and the Caucasus (PharmALL)” (Pistrick et al. 2008). Existing gene bank collections should be enriched and former results compared with the *status quo*, contributing substantially to the conservation of plant genetic resources and the investigation of genetic erosion as suggested by Hammer and Teklu (2008).

Table 1: Chronology of the collecting mission to Georgia (Caucasus Mountains from August 5th to 11th, 2008

| | |
|-------------|--|
| 5./6.8. | Flight from Frankfurt a.M. to Tbilisi. Discussion on the programme of excursions and final preparations. Travel to Kutaisi. Collection at the northeast border of the town and at Gelati (350m asl). |
| 7. 8. | Travel to Mestia via Zugdidi, Chaiši and the Inguri gorge. |
| 8.8 – 10.8. | Basis quarter in Mestia. Daily excursions in Upper Svanetia. |
| 8.8. | Excursions to Leli, southeast of Mestia and to Lalaida and Laghami, northwest of the town (1450 – 1600m asl). |
| 9.8. | Excursion in southwest direction to the Latali community. Collecting in the villages of Macchvariši, Škaleri, Lachušdi and Kvančianuri (1300 – 1350m asl). |
| 10./11.8. | Breaking off of the mission due to war conditions. Travel back to Zugdidi and via Senaki, Samtredia, Kobuleti, Batumi to the Turkish border at Sarpi. Return to Tbilisi via Achalciche, respectively Istanbul and flight to Frankfurt a.M. |

Field work of the 2008 collection in Georgia started on 8 August, but had to be abandoned due to the war conditions in the country two days later (Table 1, Fig. 1). Nevertheless some impression of the recent situation of plant genetic resources in the surroundings of the town of Mestia, Upper Svanetia and some remarks on the plant material collected have been obtained.

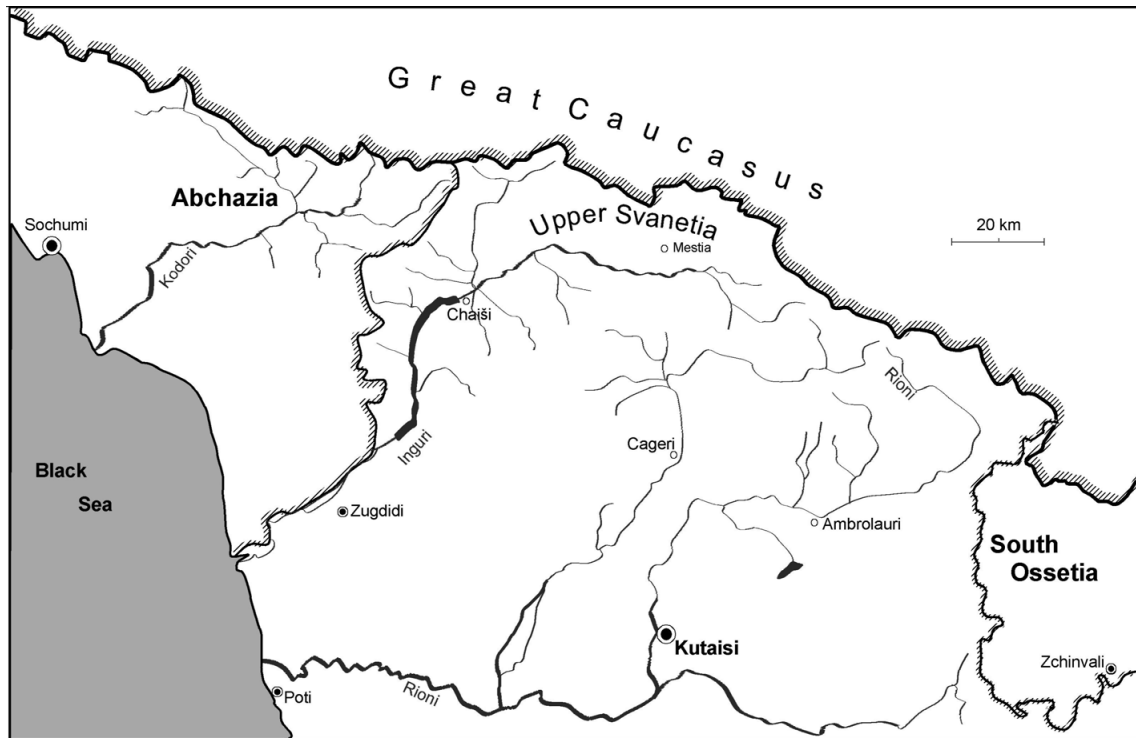


Figure 1: Area of the 2008 collecting mission in Georgia

Results

Upper Svanetia is an isolated mountainous region of Georgia, situated in the basin of upper Inguri and its tributaries, south of the main ridge of the Great Caucasus (Fig. 1). For several years it was not easy to travel to this region after the Abkhazia conflict. Reportedly, genetic erosion further increased especially in cereals, compared with the situation in the beginning of the 1980s (Beridze et al. 1982, 1985). However, changes in land use were much less drastic than in Eastern European high mountainous areas, where the specialization on cattle breeding caused radical conversion of all arable land into grassland (Pistrick et al. 1995). Especially in the large house gardens, a great diversity of indigenous landraces and local varieties of vegetables, pulses and spice plants continues to be grown (Fig. 2). A total of 56 accessions could be obtained (Table 2) in addition, herbarium material (22 numbers in 30 sheets) was collected, including cultivated and locally used plants and their wild relatives.



Figure 2. Images of the area around Landžeri in Upper Svanetia (Georgia), summer 2008.

In villages of Upper Svanetia, as Landžeri with the typical mediaeval peels (Figure 2), a great diversity of traditional crop plants is still cultivated in large house gardens. At Kvančianuri (below) *Capsicum annum*, *Zea mays*, *Solanum tuberosum*, *Brassica oleracea* var. *capitata*, *Ocimum basilicum*, *Cucumis sativus*, *Tagetes erecta*, *Phaseolus vulgaris* var. *vulgaris*, *Lycopersicon esculentum*, *Anethum graveolens* and *Lactuca sativa* are grown at 1350 m together with *Panicum miliaceum*, *Allium fistulosum*, *Phaseolus vulgaris* var. *nanus*, *Trigonella caerulea*, and *Vicia faba*.

Table 2: Material collected during the 2008 collecting mission in Georgia

| Crop | No. of accessions | Sum |
|---|--------------------------|------------|
| <i>Avena sativa</i> L. | 1 | |
| <i>Hordeum bulbosum</i> L. | 1 | |
| <i>Panicum miliaceum</i> L. | 2 | |
| <i>Zea mays</i> L. convar. <i>mays</i> | 3 | |
| <i>Triticum aestivum</i> L. | 1 | |
| Cereals and grasses | | 8 |
| <i>Brassica napus</i> L. | 1 | |
| <i>Brassica oleracea</i> var. <i>capitata</i> L. | 1 | |
| <i>Cucumis sativus</i> L. | 2 | |
| <i>Daucus carota</i> L. | 1 | |
| <i>Solanum tuberosum</i> L. | 3 | |
| Vegetables and cucurbits | | 8 |
| <i>Phaseolus vulgaris</i> var. <i>nanus</i> Asch. | 5 | |
| <i>Phaseolus vulgaris</i> L. var. <i>vulgaris</i> | 5 | |
| <i>Pisum sativum</i> L. | 2 | |
| <i>Lens culinaris</i> Medik. | 1 | |
| <i>Vicia faba</i> L. | 4 | |
| Pulses | | 17 |
| <i>Allium cepa</i> var. <i>aggregatum</i> G. Don | 2 | |
| <i>Allium sativum</i> L. | 2 | |
| <i>Allium fistulosum</i> L. | 2 | |
| <i>Anethum graveolens</i> L. | 1 | |
| <i>Apium graveolens</i> L. | 2 | |
| <i>Coriandrum sativum</i> L. | 5 | |
| <i>Petroselinum crispum</i> (Mill.) Nym. | 1 | |
| <i>Tagetes patula</i> L. | 1 | |
| <i>Trigonella caerulea</i> (L.) Ser. | 5 | |
| Spices | | 21 |
| <i>Vicia</i> sp | 1 | |
| <i>Fragaria vesca</i> L. | 1 | |
| Other crops and wild relatives | | 2 |
| TOTAL | | 56 |

Cultivation of indigenous wheat (Girgvliani 2001) completely disappeared in the collection area and new introductions of *Triticum aestivum* from lower altitudes have obviously not been very successful under the conditions of Upper Svanetia. *Panicum miliaceum* (Svanish: pat'v), another ancient indigenous cereal plant, could still be collected at Kvančianuri and Ieli as a relic crop in a diverse mixture of different seed types (Fig. 3). However, most of the former millet cultivation has been replaced by the now dominating maize, introduced in Upper Svanetia probably in 1911 (Girgvliani 2001). The material collected of some older landraces of flint corn (*Zea mays* convar. *mays*) has cream coloured and red-brown grains. Second to maize, potatoes (*Solanum tuberosum*) are the staple food in the region. Older varieties with brown and violet red tubers were obtained. Similar to cereals, also in pulses an introduction from the New World (*Phaseolus vulgaris*) widely replaced ancient indigenous taxa (*Vicia faba*, *Pisum sativum*, *Lens culinaris*) in cultivation. Common bean, introduced into the western part of Upper Svanetia before the beginning of the 20th century (Girgvliani 2001), developed in Georgia a secondary centre of variability (Beridze and Hanelt 1991, Hanelt 2004). The great number of seed variants cultivated in the restricted collecting area is comparable to that one reported from Western Carpathians (Fig 4; Kühn et al. 1982). Many old traditional legumes could still be found in cultivation in the village of Ieli (1600 m). Great variability showed especially the accessions of the rare relic crops *Pisum sativum* (12 seed types) and small seeded *Lens culinaris* (18 seed types). Faba beans are grown in several other villages (Lalaida, Lag'ami, Kvančianuri) as well. A broad spectrum of local spice plants is cultivated in many house gardens (Fig. 2). Remarkable variation in seed colour show all accessions of sweet trefoil (Fig. 3), widely used in the Georgian kitchen. The Svanish vernacular name "šambrikai" is completely different from the Georgian "uccho suneli", indicating the long time of cultivation in Svanetia.

For a more detailed assessment of the recent situation of plant genetic resources in Svanetia the exploration mission has to be continued very soon.

Variable seed colour indicates considerable genetic diversity in landraces of quite different taxa, such as *Trigonella caerulea* (Leguminosae; left) and *Panicum miliaceum* (Gramineae; right). The sample no. 48 (left) from Lachušdi consists of equal proportions of the following seed colours: blackish violet, olive green with dense violet spots and dots, yellowish green to olive green with scattered violet spots and dots, and greenish yellow without spots and dots (from the top). In accession no. 51 (right) from Kvančianuri grey and yellow coloured grains (top and third from the top) dominate some admixtures of yellowish grey (second from the top) and white grains (below).

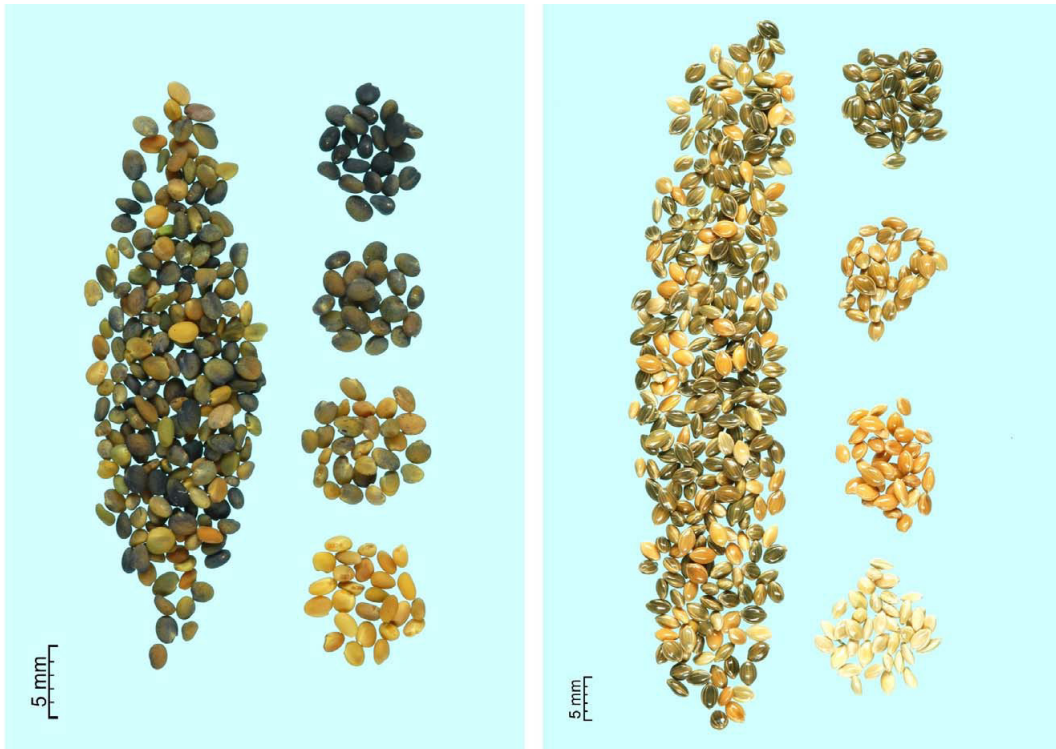


Figure 3. Seeds of *Trigonella caerulea* (left), *Panicum miliaceum* (right) from landraces collected in summer 2008 at Kvančianuri and Jeli, Upper Svanetia (Georgia).



Figure 4. Seeds of *Phaseolus vulgaris* collected in the Western Carpathians (Kühn et al. 1982).

Seed variants of the garden beans from the Upper Svanetian communities Latali, Mestia and Ieli. Upper three rows: *Phaseolus vulgaris* var. *vulgaris*, Lower two rows: *Phaseolus vulgaris* var. *nanus*. Colours from left to right:

1st row – beige with brown edge and yellowish brown halo around the hilum; beige with brown dots and with brown edge and violet grey halo around the hilum; yellowish brown with brown edge and yellowish brown halo around the hilum; violet red with translucent brown edge and yellowish brown halo around the hilum; violet red with blackish red edge around the hilum.

2nd row – black; beige with violet stripes, spots and dots and with brown edge and yellowish brown halo around the hilum; the same colour as before; white with greyish violet round blotches, greyish violet covered from the hilum side with translucent brown edge and yellowish brown halo around the hilum; beige with greyish brown stripes and spots and with brown edge and yellowish brown halo around the hilum.

3rd row – beige, nearly completely covered by greyish brown stripes and spots and with brown edge and dark yellowish brown halo around the hilum; beige, blackish brown marbled with greyish brown and black stripes and spots and with dark brown edge and yellowish brown halo around hilum; beige with blackish violet stripes and spots and with brown edge and yellowish brown halo around hilum.

4th row – white; beige with brown edge and yellowish brown halo around hilum; yellowish brown with brown edge and yellowish brown halo around hilum; yellowish brown with brown edge and violet grey halo around hilum; violet red with brownish red edge round hilum; the same colour as before.

5th row – blackish violet with black edge and blackish brown halo around hilum; white with grey and black stripes and spots and pink at the hilum side with pink edge and white halo around hilum; white with round dark violet red blotches and dark violet red at the hilum side; beige with dark violet red stripes, spots and dots and with brown edge and yellowish brown halo around hilum; beige, black marbled with black stripes and spots and with a translucent brown edge and yellowish brown halo around hilum.

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