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The Pomegranate National Collection of Afghanistan

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Abstract. The Perennial Horticulture Development Project – Afghanistan is a project in support to the Ministry for Agriculture of Afghanistan. The main goal is the strengthening of the perennial horticulture through the development of a highly standardized nursery sector and the adoption of local genetic resources. Pomegranate has been surveyed in a wide area of the Afghan territory and collected during the first phase of the project (2006-2010). The *in situ* collection holds 60 different labeled and recorded varieties located in various provinces. These accessions have been propagated and planted in year 2009 in two different duplicated *ex situ* collections. Besides a first characterization of the *in situ* collected material reported in the PHDP Germplasm "*In-Situ*" Collection Database, all the clones are being fully characterized and evaluated following international descriptor lists and standards.

Keywords. *Punica granatum* – Germplasm – Repository.

I – Introduction

Afghanistan is an area of diversification for many fruit tree species, among which pomegranate. The areas of major diffusion of scattered wild populations and of productive orchards are the Provinces of Kandahar, Balkh, Farah, Kapisa, Samangan, Nagharhar and Heart (Samadi, 2008). The total production in 2007 was of about 500,000 t (Source: Ministry of Agriculture, Irrigation and Livestock) on a surface of about 42,000 hectares, contributing for about 2% of the total horticultural production of Afghanistan (Glozer and Fergusson, 2008). In the last few years the demand of pomegranate is increasing and new orchards have been established. About 50,000 t were exported as fresh fruits in 2009.

Samadi (2008) described 48 cultivars coming from various Provinces of Afghanistan, and differently characterized by colour, flavor and seed hardiness. Few cultivars are sweet and "seedless", while most of them are medium-sweet to sweet taste and bring hard seeds. "Kandahari" and "Bedana" (which means "seedless") are considered two excellent cultivars (Glozer and Fergusson, 2008). The propagation of pomegranate is traditionally carried on by cuttings collected from productive trees, nevertheless a formal and traced procedure is lacking. As a result, orchards are not homogeneous and different varieties are grown together in the same orchard. This aspect may be considered as positive in a subsistence fruitculture, since genetic and phenotypic variation ensures to obtain a certain amount of production notwithstanding possible adverse climatic events, and the disruption of diseases and pests. Nevertheless, in an advanced fruitculture heterogeneous orchards are an obstacle.

II – The Perennial Horticulture Development Project (PHDP)

In 2006 the European Commission-EuropeAid Programme funded the Perennial Horticulture

Development Project (PHDP) (www.afghanhorticulture.org) in support to the Ministry of Agriculture, Irrigation and Livestock of Afghanistan. A second phase was supported by EC for the period 2011-2015. As stated in the project web pages "*The specific objective of the project is to develop a demand oriented and export led perennial horticulture industry*". A major purpose of the project is to develop the nursery sector of this country in order to strengthen and to qualify fruit production. The main activities regard the establishment of a traced nursery system based on the propagation of true-to-type local varieties. The adopted steps can be summarized as follows: (i) individuation of superior trees in productive orchards; (ii) cataloguing and definition of the *in situ* National Collection; (iii) propagation from the *in situ* original mother plants; (iv) establishment of the *ex situ* National Collection; (v) characterisation and evaluation; and (vi) foundation of traced mother stock nurseries (MSN).

III – The Pomegranate National Collection of Afghanistan

During the years 2006-2008 different areas of the country were surveyed in order to individuate and collect superior accessions of fruit tree species, including pomegranate. Local experts, nurserymen and fruit growers participated actively to this search. The main criteria to select the tree samples to be introduced in the "*In situ*" National Collection were based on the principle that the high market value genotypes and also some outstanding genotypes should be collected. This activity resulted in the field registration and labelling of 956 *in situ* accessions of different species, 60 of which were pomegranates Passport data and when possible a first characterisation was carried on Fig. 1.

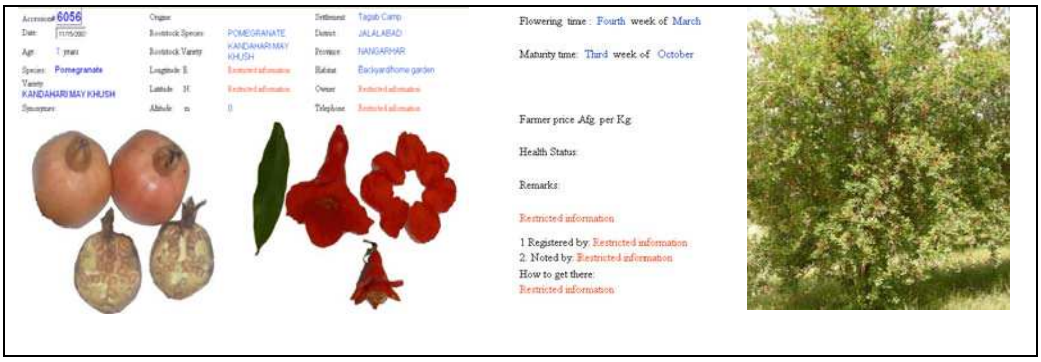

Fig. 1. Passport data and pictures of "Kandahari May Khush" (Clone AFG6056) from the PHDP *In situ* Collection Database (see http://afghanistanhorticulture.org/Germplasm.aspx).

The *ex situ* Pomegranate National Collections were established as duplicates in Nangarhar and Kandahar Provinces in 2009; they hold 59 Afghan varieties and 20 imported cultivars, as listed in Table 1. Each collection consists of 6 replicated trees of all clones. When available, phenological data, such as flowering and ripening time of fruits were collected in 2010 and 2011. A descriptor list was defined taking into account the Descriptor List of Pomegranate (EC GENRES29 Project, 1996) and other descriptors lists (Bellini *et al*., 2007). The standardised characterisation and evaluation, which regarded all the organs of the tree, and especially fruits, started in year 2011.

The Pomegranate National Collection is considered the official repository of this species and it represents an authorised source of propagation material to constitute mother stock nurseries, from where high quality and traced cuttings will be used for the production of true-to-type saplings by the private nursery sector.

Table 1. List of the accessions of the Pomegranate National Collection (AFG = domestic clones; IMP = imported cultivars)

AshkShoter-AFG0872	Kandahari-AFG5019	Sherinak-AFG6058	Wonderful-IMP7163
BaluchKhani-AFG4082	Kandahari-AFG6057	ShinaDanadar-AFG6064	Mae-IMP7164
Bedana-AFG0345	Kandahari-AFG6066	SorDoublPosti-AFG0389	Eve-IMP7165
Bedana-AFG0383	KandahariMayKhush-AFG6056	SorKhog-AFG0382	PurpleHeart-IMP7166
Bedana-AFG0762	LalBaqliDana-AFG4067	SorZodRas-AFG0385	Sakerdze-IMP7167
Bedana-AFG5018	Mahali-AFG0884	Sorkhak-AFG0296	Al-sirin-nar-IMP7168
Bedana-AFG6053	ManayiSur-AFG0384	Sorkhak-AFG0859	ApseronskiKrasnyj-IMP7169
Bedana-AFG6060	MayKhosh-AFG0873	Sorkhak-AFG0878	NikitskiRanni-IMP7170
Bedana-AFG6061	MayKhosh-AFG6065	SpinKhog-AFG0386	Zubejda-IMP7171
Bocha-AFG6068	MayKhoshShinki-AFG5025	SpinKhog-AFG0563	Crab-IMP7172
Bum-AFG0387	MayKhoshSpin-AFG5022	SpinTrush-AFG0388	Cranberry-IMP7173
Danadar-AFG0761	NazekPost-AFG0561	Tashkurghani-AFG0860	Palermo-IMP7174
DanadarSor-AFG5020	PandPost-AFG0562	Tashkurghani-AFG6063	MedovyiVahsha-IMP7175
Fakhi-AFG4081	Pastaki-AFG6067	Tor-AFG0390	Ariana-IMP7176
Kabli-AFG5021	Qohi-AFG0295	Turosha-AFG6054	Girkanets-IMP7177
Kabuli-AFG6059	SabzakDaniSafid-AFG4079	Turosha-AFG6069	Sumbarskii-IMP7178
Kabutak-AFG0297	SabzakDaniSorkh-AFG4080	TuroshaShinki-AFG0763	Mayatadzhy-IMP7179
KagaShin-AFG5024	Sherinak-AFG0302	TuroshaTaki-AFG6062	Andalib-IMP7180
KagaSpin-AFG5023	Sherinak-AFG0861	ZerAnar-AFG0298	Sirenevyi-IMP7181
Kandahari-AFG0862	Sherinak-AFG6055		Kopetdag-IMP7182

During 2011-2013 it is planned to complete the characterisation and evaluation of the *ex situ* collected accessions. All the clones will be described and a list of recommended varieties of pomegranate for Afghanistan will be released. Data will be used to compare clones in order to identify them and to discard duplicates and fill possible gaps.

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