

Summary of apricot self pollination trial results 2010-2012 Afghanistan PHDP

The Perennial Horticulture Development Project (PHDP) began making a National Collection of Varieties of Apricot in Afghanistan in 2006 and 2007. Surveys were made across the country of fruit growers and nursery growers to identify the various varieties of apricot that were in cultivation. There was particular emphasis on ensuring that varieties being propagated by commercial nurseries were collected, as it was thought that those varieties were considered to be the most important by the fruit growers and nursery growers.

During the survey, individual trees that were identified by local fruit growers or nursery growers as representative of the particular varieties were marked as exemplar trees, and basic information ("passport data") about these trees was collected. Some individual trees that were considered to have improved characteristics were also collected, although some inexperienced collectors did mark trees for collection that proved to have no agronomic value whatsoever, and were later discarded. Some varieties collected were identified as of fairly recent foreign origin, possibly varieties imported during the 1990s. As the provenance of these varieties was uncertain, the method of collecting these foreign varieties was the same as for the local varieties.

At the end of 2006/beginning of 2007, PHDP established rootstock nurseries of wild (bitter) apricot seedlings to be budded with the budwood from the exemplar trees. Each of the exemplar trees was assigned a code number which became the accession number in the national collection. Depending on the availability of budwood from the exemplar tree, upwards of 200 buds were collected from the single exemplar trees, with the collection procedure being fully documented. A detailed protocol was followed to ensure that all 200 or more plants per accession were correctly labelled, and their identity maintained throughout the growing on and distribution process. The apricot rootstocks were budded during summer 2007, and headed back in February/March 2008. The resulting trees were then planted out in the national collections in February/March 2009. Six trees of each accession were planted in national collection plots in Mazar and Kabul Perennial Horticulture Development Centres (PHD Centres). Some trees were kept back to be used for replanting of any gaps in the national collections, and other trees were made available to nursery grower associations as registered mother stock trees and to various organisations for planting out as variety demonstrations.

In addition to the locally collected varieties, a number of newly imported varieties were added to the collection based on the documentation received at the time of import.

At the end of 2007, there were 57 separately named "varieties" of apricot in the PHDP nurseries, represented by 137 different *in situ* exemplar trees. Some 136 accessions were planted out in the Kabul PHD Centre in March 2009. Some poor quality varieties (semi-wild types) were discarded in 2010, and further accessions including newly imported varieties have been planted since 2009.

Since planting out the national collection of apricot varieties in February and March 2009, the PHDP, and its successor project PHDP II have undertaken a programme of characterisation of the accessions in the national collection of apricots, with characters based on the UPOV descriptors system. This has been undertaken in stages each year as the plants in the collection have grown and matured, and the plants have reached the flowering and fruiting stage. A limited number of mainly foreign varieties flowered and fruited in 2010, but while most of the Afghan varieties flowered from 2010 onwards, they did not set fruit until 2012.

It was known from the literature that Central Asian apricots were generally self sterile, compared to the European and American varieties, which are generally regarded as self pollinating, even though there quite a few exceptions among important varieties. It was therefore considered early on that the project would test the pollination characteristics of the apricot national variety collection. In fact, some 100 accessions out of the 135 planted at Badam Bagh were seen to have good fruit bud formation in the nursery prior to planting out, and it was thought that an early opportunity was available to test self pollination in a number of the accessions. However, the weather at flowering time was cool and wet, and the cotton muslin material used to protect the flowers from cross pollination absorbed the moisture and flapped around in the wind to damage any flowers, mostly preventing any results being obtained. Only two results were recorded out of a large number of self pollination trials carried out.

Result of Apricot self pollination trial in Badam Bagh PHD Centre, 2009

<i>Variety</i>	<i>no. of flowers pollinated</i>	<i>no. of fruit set</i>	<i>% Fruit set</i>
JA 6215(Charmaghzi)	17	6	35%
JA 6212(Badami)	25	5	20%

Result of Apricot self pollination trial in Fac. Agric. Kabul University, 2009

<i>Variety</i>	<i>no. of flowers pollinated</i>	<i>no. of fruit set</i>	<i>% Fruit set</i>
Korpa	95	9	9%
Charmaghzi	65	0	0%
Bidmushk	85	15	18%
Amiri	40	1	3%
Shakarpara	60	9	15%
Nooraghai	83	16	19%
Saqi	30	2	7%

The difference between the two trials was that the trees in the Kabul University trial had been planted a year earlier, so were more likely to set fruit. Both trials were supervised by Prof Samadi of Kabul University, using students to actually carry out the pollination. Note that whereas the trials at Badam Bagh were with named accessions, the trials at Kabul

University used trees obtained from unidentified sources. The different results with Charmaghzi in the two trials clearly demonstrates that Charmaghzi is not a single variety, but rather an all inclusive name for a group of varieties. This applies to many other "varieties" in Afghanistan, and the work of the PHD Centres with the national collections is to separate and describe all the different accessions, and eventually distinguish between different accessions with the same "varietal" name.

Apricot self pollination trials 2010

PHDP again undertook a programme of self pollination of the national collection apricots in Badam Bagh PHDC Kabul in 2010. For the self pollination trials in 2010, the project tried out different materials for protecting the flowers from pollinating insects, as the cotton muslin material used in 2009 had proved to be very damaging to the flowers in wet and windy weather. A range of nylon curtain netting materials were tested in the months before the pollination season, and a relatively fine mesh white nylon curtain material was chosen. The material chosen did not absorb moisture and stayed stiff and in place through months of winter weather without flapping in the wind. The chosen material was put in place in late winter before bud burst, covering the length of an apricot branch with an estimated 100-200 flower buds on it. Two branches for each accession were covered in this way. A group of students were responsible for the self pollination work, supervised by the adaptive research coordinators in PHDP.

The actual self pollination activity was made very simple, firstly because a simple procedure seemed sufficient at this point in the work with the national collection of apricots, and secondly, a quick and easy method was necessary to allow coverage of a large number of varieties that were in flower over a very short period. The students would unpin and open the netting sufficiently to allow access to the blossom, and then touch each flower with another flower to ensure pollen was moved to the stigmas. The pollination process was undertaken and 50% flowering and generally repeated at 90% flowering. The number of flowers pollinated under the net was counted, and the number of fruit that developed were also counted, sometime near or at maturity.

In the 2010 self pollination trials, the weather at pollination time was good for fruit setting, but only a limited number of accessions produced very conclusive results. Many of the typically Afghan varieties such as the Amiri types did not set any fruit, neither in the self pollination cages nor in the open field. This was in spite of good pollination weather, plenty of pollinating insects, and an abundance of other varieties of apricot to ensure cross pollination even if self pollination was not possible. This lack of fruit set was ascribed to "juvenility" apparent in the local germplasm, and was not seen at all in the well known American and European apricot varieties being grown in the national collection.

SUMMARY OF SELF POLLINATION TRIAL RESULTS 2010-2012

Varieties considered self fertile based on trials 2010-2012

206	(Amiri)	267	Gold Kist	830	Shakarpara
268	Ambercot	290	Maidani	464	Shakarpara Panjshir
4037	Aqa Banu	540	Nari	331	Shakarpara Safid
362	Bada Ghor	355	Nari Spin	212	Tom Cot
6212	Badami	266	Patterson	6211	Trevatt
6213	Badami Dir Ras	292	Pir Naqshi	6313	Turki
4025	Baghal Sorkh	366	Sardayi	6315	Turki 1
6310	Charmaghzi	478	Shakarpara	IMP7264	Portici
6215	Charmaghzi	826	Shakarpara		

Note accession 206 is very close to Turki 6313, and is misnamed as an Amiri type

Self fertile varieties needing pollinators for full fruit set

The following self fertile varieties generally produced a low fruit set under 30%, and would benefit from the presence of a pollinator variety. However, for varieties such as Tomcot and Ambercot, which are early varieties that are capable of producing large fruit, the lower fruit set may avoid the need for thinning for obtaining best market value product.

6211	Trevatt	267	Gold Kist	6212	Badami
4037	Aqa Banu	830	Shakarpara	362	Bada Ghor*
366	Sardayi	268	Ambercot		
4025	Baghal Sorkh*	212	Tom Cot		

**The accessions 4025 Baghal Sorkh and 362 Bada Ghor gave variable results and could have been classified as self incompatible based on 2012 trials alone.*

Self incompatible varieties that must be planted with a pollinator

The following varieties consistently produced very little or no fruit when self pollinated. They must be planted with other varieties to produce crops of fruit.

451	Agha Khani	4037	Aqa Banu	1014	Ghat Spin
247	Amiri	IMP7135	Aurora	265	Goldcot
276	Amiri	362	Bada Ghor	IMP7136	Goldrich
278	Amiri	4025	Baghal Sorkh	2045	Haidari
309	(Amiri)	320	Baqi Khani	456	Hazara
326	Amiri	246	Beid Mushk	832	Jauras
329	(Amiri)	245	Charkhi	833	Jauras
453	(Amiri)	330	Charkhi	834	Jauras
482	Amiri	831	Charkhi (Amiri)	835	Jauras
485	Amiri	819	Charkhi Safid	836	Jauras
820	Amiri	248	Charmaghzi	180	Jauzay
821	Amiri	356	Charmaghzi	4018	Jebraile
822	Amiri	823	Charmaghzi	4019	Jebraile
1012	Amiri	4035	Charmaghzi	417	Kandahari
4038	(Amiri)	748	Du Maghza	827	Kandahari
6216	Amiri	749	Du Maghza	243	Kur Pa
365	Amiri Kalan	313	Enkeshafi - 313	467	Mahali
363	Amiri Maida	746	Farahi	251	Nooraghai
328	Amiri Sorkh	747	Farahi	462	Nooraghai

IMP7137	Pinkcot	750	Rughani	830	Shakarpara
207	Qaisi	751	Rughani	6214	Shakarpara
244	Qaisi	4017	Rughani	275	Shakarpara Safid
465	Qaisi	4040	Rughani	373	Shakarpara Safid
480	Qaisi	454	Safidak	250	Shakarpara Sorkh
483	Qaisi	825	Safidak	372	Shakarpara Sorkh
741	Qaisi	249	Saqi	2046	Shekhmeri
824	Qaisi	5002	Saqi	336	Tajiki
4041	Qaisi	5003	Saqi	305	Talkhak
6204	Qaisi	5004	Saqi	303	Talkhak Dana
407	Qaisi Safid	5005	Saqi	2047	Tarnaw
760	Qaisi Safid	366	Sardayi	4036	Turki 1
5000	Qaisi Safid	529	Shakarpara	463	Turki 2
5001	Qandak	744	Shakarpara	4039	Turki 2
466	Rangahi	745	Shakarpara	208	Valayati
481	Rangahi	828	Shakarpara		
484	Rangahi	829	Shakarpara		

The accessions 309 (Amiri), 329 (Amiri), 453 (Amiri), are not considered to be true Amiri types based on fruit qualities. The accession 831 (Charkhi) is considered to be an Amiri type.