

Almonds of Afghanistan

First Edition

Afghan Almond Industry
Development Organization
موسسه انكشاف صنعت بادام افغانستان





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Almonds of Afghanistan

Written by: Gary Kuhn

Javid Hamidzada

Editorial Committee: J.D. Zach Lea, PhD

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Afghanistan Almond Industry Development Organization

Afghanistan Almond Industry Development Organization (AAIDO) established on 1st December 2007, as a nongovernment national organization registered with the Ministry of Economy. AAIDO is formed by national experts, almond nursery producers, almond farmers, processors, and exporters to promote the almond industry in Afghanistan.

AAIDO Mission Statement

Afghanistan Almond Industry Development Organization (AAIDO) rebuilds the reputation of Afghan almonds in national and international markets by increasing the production, improving the quality, and promoting the marketing efforts.

AAIDO is established to transform the Afghan almond industry from a traditional system to a sustainable technology advanced system and boosts the public – private sector dialogues to remove the barriers and impediments towards almond industry development presenting appropriate solutions. AAIDO will link producers, traders, support businesses, NGOs and government into a collaborative effort to build the Afghan almond industry.

This manual highlights some of the best almonds from Afghanistan. They were selected due to their quality, superior taste and consistency. The selections are from the following varieties:

- ❖ Satarbai
- ❖ Qambari
- ❖ Qaharbai
- ❖ Abdul Wahidi
- ❖ Khairodini
- ❖ Belabai

These are also the varieties that are being planted in the numerous orchard development programs in the South, East, Central and Northern regions.

For more information, see www.aaido.af or call

Javid Hamidzada, Chief Executive Officer

Afghanistan Almond Industry Development Organization (AAIDO)

Tel: +93 (0) 799-758977

Email: afghan.almond@gmail.com

Address: Karte Char, Pul-e-Surkh, 2nd Street



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Introduction

Afghanistan has a unique climate that provides perfect conditions for almonds. With hot days and cooler nights, the fruit matures with a high sugar content and good flavor. The dry spring and summer allow for excellent growing conditions and water run-off from the Hindu Kush keep the orchards irrigated through harvest. The country is in the epicenter of perennial crops. These perfect conditions are the reason for such a diversity of varieties. Currently the Ministry of Agriculture, Irrigation and Livestock has 78 native varieties of almonds in their germplasm sites.

Almond farming is limited to the irrigated lands adjacent to rivers in Afghanistan. Growing in fertile valleys, the almond orchards form green ribbons through the dry landscape of Afghanistan. Although irrigated land is precious in the country, there are over 12,000² hectares of almond orchards. Most cultivate about ½ hectare of land and work the land with their family. So there are around 24,000 almond farmers. Due to the excellent climate for almonds, the yields are quite high and increasing as new methods and technologies are introduced. The Afghan almonds command strong market demand. Afghanistan now is focusing an increasing amount of their production and the quality.³

Afghan Almond Industry

42,000 MT Annual Production (2007/08)¹
- Afghanistan is #4 producer in the world

\$168M Annual Crop (2007/08) est.

7,353 MT Annual Exports (2007/08)³

\$50.2 million Annual Export
- 11% of all Afghan exports

12,000 ha existing orchards²
- 1,200 ha new almond planting 1386 (2008)

78 native varieties, 6 imported varieties

Types of Almonds

Direct Consumption

Almost all Afghan native almond clones are producing nuts for direct consumption as whole nuts.

Confectionaries Almond

Murtawage, Sanghi, Non-Periel are primarily used for processing with other foods. The almonds are shelled, and then prepared in a number of ways, like slicing, dicing or halving.

Afghan Grades

Top Quality, Soft Shell (primarily Satarbai, also Belabai) sold in shell to India and UAE. These almonds are probably the best in the world. Excellent flavor, no bitters, soft shell, and well known throughout the South Asia and Middle East. The prices for these almonds ranged in 2009 from \$6.47/kg to \$10.59/kg, in shell.

¹ Horticulture Department of Ministry of Agriculture, Irrigation and Livestock, 2007/2008

² Overall land under almond cultivation provided by Ministry of Agriculture, Irrigation and Livestock, 2007/2008.

³ Afghanistan Trade Statistical Yearbook, 2008/2009, Central Statistics Organization.

2nd Quality, Soft Shell (primarily Satarbai) sold in Pakistan and Local markets. Same nuts as above, but has been sorted for the second level quality.

Hard Shell (Qambari, Qaharbai, Abdul Wahidi, and Khairodini) are lesser quality almonds, often shelled in Afghanistan, destined for local and Pakistani markets. These are medium to hard shell nuts. The price range for this group in 2009 was \$3.77/kg to \$5.00/kg in 2009.

Almond Growing Regions of Afghanistan

Afghanistan grows almonds throughout the country. Due to the wide range of elevations in Afghanistan, harvest periods can range from August through November.



Southern Region

In the southern region Uruzghan is the main production area with lesser amounts from Helmand and Zabul.

Northern Region

The north is the main almond production area for Afghanistan. From Sar-e-Pul to Takhar almonds are produced in abundance. Samangan has the largest concentration of almonds in this region, followed by Balkh (5,500 MT per annum), then lesser amounts from Kunduz, Sar-e-Pul and Takhar. Increased plantings in Balkh and Samangan will increase their production starting in 2012.

Central

Ghorband has the highest concentration of almonds in the central region, but this region has rather limited arable land. Logar and Ghazni produce fair amounts and some in Kabul.

West

Herat produces minor amounts of almonds.

East

Laghman produces small amounts of almonds, but recent plantings will increase production in this area.

Comparison of AAIDO Selected Commercial Varieties/Clones

As of August 2009

Almond Variety/Clone	Price (Afs/seer) (in shell)	Price (\$/kg) (in shell)	Kernel to Nut weight ratio
Satarbai Mamakhail	3,600	\$10.59	59%
Satarbai Guldar	2,800	\$8.24	60%
Satarbai Basher	2,500	\$7.36	71%
Satarbai Sufi	2,500	\$7.36	73%
Belabai	2,300	\$6.77	69%
Satarbai Bakhmaly	2,200	\$6.47	61%
Satarbai Sais	1,960	\$5.70	53%
Qambari	1,700	\$5.00	72%
Qaharbai	1,400	\$4.12	53%
Khairodini	1,350	\$3.97	40%
Abdul Wahidi	1,280	\$3.77	36%

Conversions

Currency Rates as of January 1, 2010

\$1 = 48.55 Afs

1Euro = 69.69 Afs

1 Af = 1.8 Pak Rupee

1 Indian Rupee = 1.04 Afs

Sizes

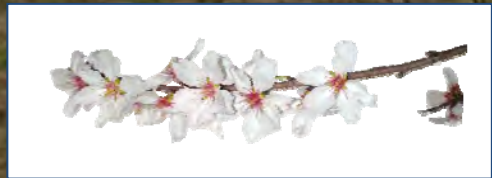
1 seer = 7 kg

Glossary for almond description

keel	The keel of the nut shell is a slightly extended edge on the sides of the nut shell.
kernel	The kernel is inside the nut shell.
nut	The nut, without husk, contains the kernel.
accession number	A number assigned by MAIL to identify a unique variety/clone.
origin	Production region thought to be the originating area for this variety/clone.
double kernels	Two kernels in one nut shell.
shell hardness	The strength of the nut shell (very soft, soft, medium, hard, very hard).

Selected Afghan Almonds







Satarbai Sufi

Accession Number

145

Origin

Khulm District of Balkh Province

Growing Regions

Currently grown in Balkh, Samangan and Kunduz Provinces.

Flowering Time

Very Early flowering time
Balkh - Fourth week of February

Harvest Time

Balkh – Mid July

Market Potential

This is one of the premiere export varieties for markets wanting whole kernels for direct

consumption. It has a strong market demand in India and Middle East. India primarily buys top quality in-shell. Bitters do not occur with the Satarbai nut, giving this nut extra value.

Price

Price in August 2009 is \$7.36 per Kg, or 2500 Afs per seer.

Quantitative characteristics

Nut is 73% of the shell weight

Nut Size

Medium length, very narrow and very thin means overall weight of the nut is very



light.

Kernel Size

Kernel size is long, but very narrow and thin. The weight is light.

Shell Hardiness

The shell of the nut very soft.

Keel Development

The keel is weak.

Shell Color

The color of the shell is light.

Kernel Color

The color of the kernel is cream.

Physical Size

	Kernel	Nut
Length (mm)	28.1	36.1
Width (mm)	9.2	12.4
Thickness (mm)	7.0	9.6
Weight (gm)	0.9	1.3
Count per kg	1,111	769







Satarbai Guldar

Accession Number

157

Origin

Center of Aybak in Samangan Province

Flowering Time

Early flowering time
1st week of March

Harvest Time

Mid July

Growing Regions

Currently grown in Samangan and Kunduz Provinces.

Market Potential

This is one of the premiere export varieties for markets wanting whole nuts for direct

consumption. It has a strong market demand throughout Central Asia and Middle East Asia.

Price

Price in August 2009 is \$8.24 per Kg, or 2800 Afs per seer.

Quantitative characteristics

Nut is 73% of the shell weight

Nut Size

Medium length, very narrow and very thin means overall weight of the nut is very



light.

Kernel Size

Kernel size is long, but very narrow and thin. The weight is light.

Shell Hardiness

The shell of the nut is very soft.

Keel Development

The keel is weak.

Shell Color

The color of the shell is light.

Kernel Color

The color of the kernel is light brown.

Physical Size

	Kernel	Nut
Length (mm)	23.6	37.6
Width (mm)	9.2	13
Thickness (mm)	5.7	9.4
Weight (gm)	0.6	1.0
Count per kg	1,667	1,000







Satarbai Bakhmaly

Accession Number

159

Origin

Center of Aybak in Samangan Province

Flowering Time

Very Early flowering time
1st week of March

Harvest Time

Mid July

Growing Regions

Currently grown in Samangan, Kunduz and Balkh Provinces.

Market Potential

This is one of the premiere export varieties for markets wanting whole

nuts for direct consumption. It has a strong market demand throughout Central Asia and Middle East Asia.

Price

Price in August 2009 is \$6.47 per kg, or 2200 Afs per seer.

Quantitative characteristics

Nut is 61% of the shell weight

Nut Size

Medium length, very narrow and very thin means overall weight of the nut is very



light.

Kernel Size

Kernel size is long, but very narrow and thin. The weight is light.

Shell Hardiness

The shell of the nut is soft.

Keel Development

The keel is strong.

Shell Color

The color of the shell is light.

Kernel Color

The color of the kernel is brown.

Physical Size

	Kernel	Nut
Length (mm)	23.6	37.6
Width (mm)	9.2	13
Thickness (mm)	5.7	9.4
Weight (gm)	0.6	1.0
Count per kg	1,667	1,000







Satarbai Basher



Accession Number

168

Origin

Chardara District of Kunduz Province

Flowering Time

Medium flowering time
Kunduz - 2nd week March

Harvest Time

Kunduz - 1st week of July

Growing Regions

Currently grown in Kunduz, Balkh and Samangan Provinces.

Market Potential

This is one of the premiere export varieties for markets wanting whole nuts for direct consumption. It has

a strong market demand throughout Central Asia and Middle East Asia.

Price

Price in August 2009 is \$7.36 per Kg, or 2500 Afs per seer.

Quantitative characteristics

Nut is 71% of the shell weight

Nut Size

Long length, narrow and very thin means overall weight of the nut is very light.

Kernel Size

Kernel size is long, but narrow and thin. The weight is light.

Shell Hardiness

The shell of the nut is very soft.

Keel Development

The keel is strong.

Shell Color

The color of the shell is very light.

Kernel Color

The color of the kernel is light brown.

Physical Size

	Kernel	Nut
Length (mm)	29.8	41.9
Width (mm)	10.1	13.1
Thickness (mm)	7.2	9.9
Weight (gm)	1.0	1.3
Count per kg	1,000	769







Satarbai Mamakhail

Accession Number

1001

Origin

Chardara District of Kunduz Province

Flowering Time

Medium flowering time
Kunduz- 1st week March

Harvest Time

Kunduz – Mid July

Growing Regions

Currently grown in Kunduz and Samangan provinces

Market Potential

This is one of the premiere export varieties for markets wanting whole kernels for direct consumption. It has a strong market demand in

India and Middle East. India primarily buys top quality in-shell. Bitters do not occur with the Satarbai nut, giving this nut extra value.

Price

Price in August 2009 is \$10.59 per Kg, or 3600 Afs per seer.

Quantitative characteristics

Nut is 59% of the shell weight

Nut Size

Long length, narrow and very thin means overall weight of



the nut is very light.

Kernel Size

Kernel size is long, but narrow and thin. The weight is light.

Shell Hardness

The shell of the nut is very soft.

Keel Development

The keel is very strong.

Shell Color

The color of the shell is light.

Kernel Color

The color of the kernel is brown.

Physical Size

	Kernel	Nut
Length (mm)	28.6	42.5
Width (mm)	10.8	15.6
Thickness (mm)	7.0	11.9
Weight (gm)	1.1	1.8
Count per kg	909	556







Satarbai Saís

Accession Number

156

Origin

Khulm District of Balkh Province

Flowering Time

Very Early flowering time
1st week of March

Harvest Time

Mid July

Growing Regions

Currently grown in Balkh Samangan and Kunduz Provinces.

Market Potential

This is one of the premiere export varieties for markets wanting whole nuts for direct consumption. It has a

strong market demand throughout Central Asia and Middle East Asia.

Price

Price in August 2009 is \$5.70 per Kg, or 1,960 Afs per seer.

Quantitative characteristics

Nut is 53% of the shell weight

Nut Size

Medium length, narrow and very thin means overall weight of the nut is very light.



Kernel Size

Kernel size is medium length, but narrow and thin. The weight is light.

Shell Hardiness

The shell of the nut is very soft.

Keel Development

The keel is weak.

Shell Color

The color of the shell is light.

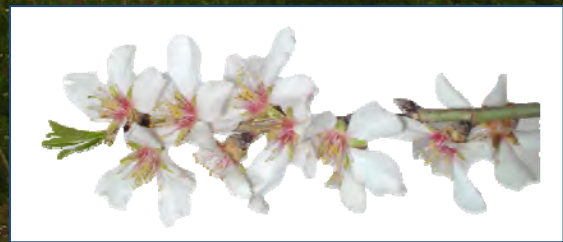
Kernel Color

The color of the kernel is brown.

Physical Size

	Kernel	Nut
Length (mm)	25.2	33.2
Width (mm)	9.2	14.0
Thickness (mm)	6.7	10.2
Weight (gm)	0.7	1.3
Count per kg	1,428	769







Qambari

Accession Number

143

Origin

Khulm District of Balkh Province

Flowering Time

Early flowering time
Balkh - 4th week February

Harvest Time

Balkh – 3rd week of July

Growing Regions

Currently grown in Balkh, Samangan and Kunduz Provinces.

Market Potential

The unique taste of this product and soft shell gives this product high value, although Qambari is not yet introduced at the international markets, but

it has attracted consumers in the local market and people wants whole kernels for direct consumption. Bitters do not occur with this variety.

Price

Price in August 2009 is \$5.00 per Kg, or 1700 Afs per seer.

Quantitative characteristics

Nut is 72% of the shell weight

Nut Size

Short length, narrow and very thin means overall weight of the nut is very



light.

Kernel Size

Kernel size is short, but narrow and thin. The weight is light.

Shell Hardiness

The shell of the nut is very soft.

Keel Development

The keel is strong.

Shell Color

The color of the shell is light.

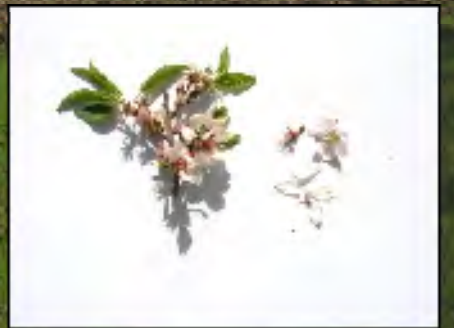
Kernel Color

The color of the kernel is light brown.

Physical Size

	Kernel	Nut
Length (mm)	21.2	29.0
Width (mm)	10.4	15.4
Thickness (mm)	7.9	10.0
Weight (gm)	0.9	1.2
Count per kg	1,111	833







Qaharbai

Accession Number

170

Origin

Chardara District of Kunduz Province

Flowering Time

Very Early flowering time
Kunduz – 4th week February

Harvest Time

Kunduz - 1st week of August

Growing Regions

Currently grown in Kunduz Balkh and Samangan Provinces.

Market Potential

This is one of the productive varieties for local markets wanting whole nuts for direct consumption. It has

recently created demand throughout Central Asia and Middle East Asian markets.

Price

Price in August 2009 is \$4.12 per Kg, or 1400 Afs per seer.

Quantitative characteristics

Nut is 53% of the shell weight

Nut Size

Long length, medium width and medium thickness means overall weight of the nut is medium.



Kernel Size

Kernel size is long, but medium width and thin. The weight is medium.

Shell Hardness

The shell of the nut is hard.

Keel Development

The keel is medium.

Shell Color

The color of the shell is light.

Kernel Color

The color of the kernel is brown.

Physical Size

	Kernel	Nut
Length (mm)	29.2	40.8
Width (mm)	12.4	19.8
Thickness (mm)	7.9	13.0
Weight (gm)	1.4	2.6
Count per kg	714	385







Abdul Wahidi

Accession Number

796

Origin

Center of Aybak in Samangan Province

Flowering Time

Very Early flowering time
Balkh – 4th week February

Harvest Time

Balkh – Mid July

Growing Regions

Currently grown in Samangan, Balkh and Kunduz provinces.

Market Potential

This is one of the known export varieties for markets wanting whole nuts for direct consumption. Larger production volume and less double kernel

characteristic of this variety gives it more reputation in the local and international markets. It has a strong market demand throughout Central Asia and Middle East Asia.

Price

Price in August 2009 is \$3.77 per Kg, or 1280 Afs per seer.

Quantitative characteristics

Nut is 36% of the shell weight

Nut Size

Very long length, wide and



thick means overall weight of the nut is medium.

Kernel Size

Kernel size is long, but medium width and thin. The weight is medium.

Shell Hardiness

The shell of the nut is medium.

Keel Development

The keel is medium.

Shell Color

The color of the shell is medium.

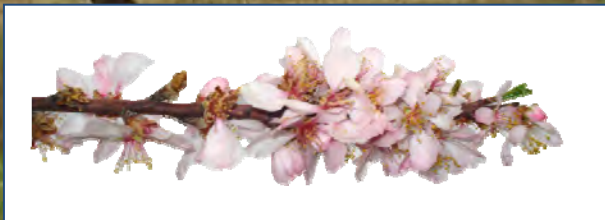
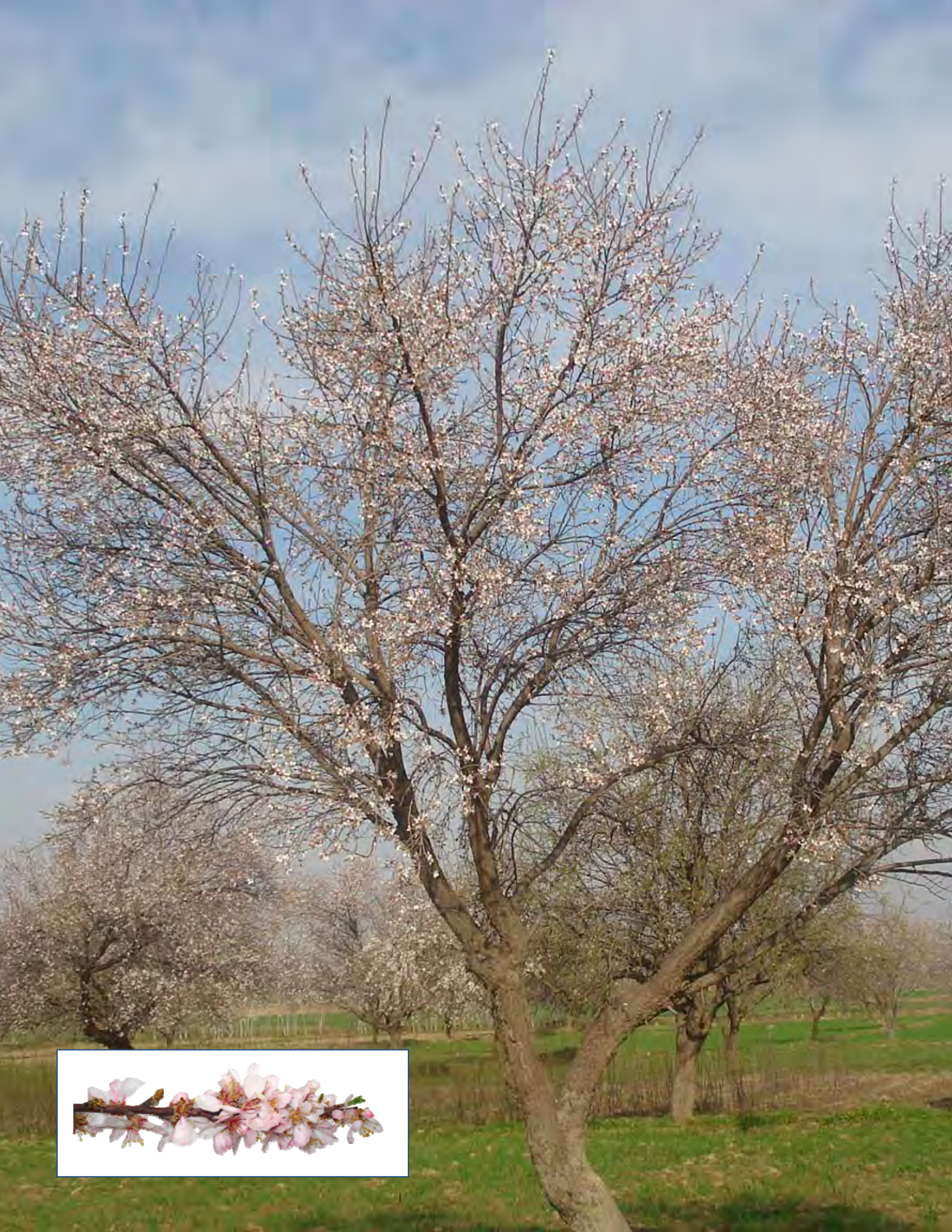
Kernel Color

The color of the kernel is light brown.

Physical Size

	Kernel	Nut
Length (mm)	29.6	46.6
Width (mm)	12.6	22.0
Thickness (mm)	7.4	15.4
Weight (gm)	1.3	3.7
Count per kg	769	270







Khairođini

Accession Number

846

Origin

Center of Aybak in Samangan Province

Flowering Time

Early flowering time
Kunduz – 1st week March

Harvest Time

Kunduz- 4th week July

Growing Regions

Currently grown in Samangan, Kunduz and Balkh Provinces.

Market Potential

This is one of export varieties for markets wanting whole nuts for direct consumption. It has a seasonal market demand throughout Central

Asia and Middle East Asia.

Price

Price in August 2009 is \$3.97 per Kg, or 1350 Afs per seer.

Quantitative characteristics

Nut is 40% of the shell weight

Nut Size

Very long length, wide and medium thickness means overall weight of the nut is medium.



Kernel Size

Kernel size is very long, wide and thin. The weight is medium.

Shell Hardiness

The shell of the nut is medium.

Keel Development

The keel is medium.

Shell Color

The color of the shell is very light.

Kernel Color

The color of the kernel is brown.

Physical Size

	Kernel	Nut
Length (mm)	33.0	43.7
Width (mm)	13.7	21.5
Thickness (mm)	6.9	14.1
Weight (gm)	1.5	3.9
Count per kg	667	256







Belabai

Accession Number

144

Origin

Khulm District of Balkh Province

Flowering Time

Very Early flowering time
Balkh – 3rd week February

Harvest Time

Balkh – 2nd week August

Growing Regions

Currently grown in Balkh and Samangan provinces.

Market Potential

This is one of the best varieties for markets wanting whole nuts for direct consumption. It has attractive look and less amount of double kernel.

Due to less production volume, this product is not yet introduced well to the international markets.

Price

Price in August 2009 is \$6.77 per Kg, or 2300 Afs per seer.

Quantitative characteristics

Nut is 69% of the shell weight

Nut Size

Medium length, very narrow and thin means overall weight of the nut is medium.



Kernel Size

Kernel size is medium, but narrow and thin. The weight is very light.

Shell Hardiness

The shell of the nut is very soft.

Keel Development

The keel is weak.

Shell Color

The color of the shell is light.

Kernel Color

The color of the kernel is light brown.

Physical Size

	Kernel	Nut
Length (mm)	26.2	35.0
Width (mm)	10.6	13.3
Thickness (mm)	7.9	10.5
Weight (gm)	1.0	1.4
Count per kg	1,000	714



Complete List of Afghan Almond Varieties & Clones

Marawaja - AFG0141	مروجه - ۱۴۱	Kafmal - AFG0773	کف مل - ۷۷۳
Sattarbai - AFG0142	ستاربابی - ۱۴۲	Marawaja - AFG0774	مروجه - ۷۷۴
Qambari - AFG0143	قمبری - ۱۴۳	Qambari - AFG0775	قمبری - ۷۷۵
Belabai	بیلابایی	Qaharbai - AFG0776	قهاربابی - ۷۷۶
Sattarbai Sufi	ستاربابی صوفی	Sattarbai Sais - AFG0777	ستاربابی سائز - ۷۷۷
Khairodini - AFG0146	خیرالدینی - ۱۴۶	Kelk Arus	کلک عروس
Majidi - AFG0147	مجیدی - ۱۴۷	Shokorbai - AFG0779	شکوربابی - ۷۷۹
Zang Kafter	زنگ کفتر	Abdul Wahidi - AFG0780	عبدالواحدی - ۷۸۰
Marawaja Maida Dana	مروجه میده دانه	Kaf	کف
Shakh Buz Zard	شاخ بز زرد	Khairodini - AFG0846	خیرالدینی - ۸۴۶
Abdul Wahidi - AFG0153	عبدالواحدی - ۱۵۳	Sattarbai Sais - AFG0847	ستاربابی سائز - ۸۴۷
Sattarbai No.4	ستاربابی نمبر 4	Shokorbai - AFG0848	شکوربابی - ۸۴۸
Shakh-i-Buz Safid	شاخ بز سفید	Sattarbai Mamakhail-AFG1001	ستاربابی - ۱۰۰
Sattarbai Sais - AFG0156	ستاربابی سائز - ۱۵۶	Sattarbai Doum	ستار بابی دوم
Sattarbai Guldar - AFG0157	ستاربابی گلدار - ۱۵۷	Abdul Wahidi - AFG1003	عبدالواحدی - ۱۰۰۳
Sangak - AFG0158	سنگک - ۱۵۸	Qaharbai - AFG1004	قهاربابی - ۱۰۰۴
Sattarbai Bakhmali - AFG0159	ستاربابی بخملی - ۱۵۹	Shakh-i-Buz - AFG1005	شاخ بز - ۱۰۰۵
Qaharbai - AFG0160	قهاربابی - ۱۶۰	Shakh-i-Buz - AFG1006	شاخ بز - ۱۰۰۶
Khairodini - AFG0161	خیرالدینی - ۱۶۱	Du Maghza Spin	دومغزه سپین
Shokorbai - AFG0162	شکوربابی - ۱۶۲	Du Maghza Kulula	دومغزه کلوله
Du Maghza	دومغزه	Sattarbai Guldar - AFG2006	ستاربابی گلدار - ۲۰۰۶
Shakh-i-Buz - AFG0164	شاخ بز - ۱۶۴	Shokorbai - AFG2007	شکوربابی - ۲۰۰۷
Marawaja - AFG0165	مروجه - ۱۶۵	Sattarbai Bakhmali - AFG2008	ستاربابی بخملی - ۲۰۰۸
Marawaja Kaghazi	مروجه کاغذی	Qambari - AFG2009	قمبری - ۲۰۰۹
Sattarbai Basher - AFG0168	ستاربابی - ۱۶۸	Majidi - AFG2010	مجیدی - ۲۰۱۰
Qaharbai - AFG0170	قهاربابی - ۱۷۰	Sattarbai Sais - AFG2011	ستاربابی سائز - ۲۰۱۱
Khairodini - AFG0172	خیرالدینی - ۱۷۲	Sattarbai Bakhmali - AFG2012	ستاربابی بخملی - ۲۰۱۲
Mahali - AFG0173	محلی - ۱۷۳	Kaghazi - AFG4016	کاغذی - ۴۰۱۶
Kafmal - AFG0379	کف مل - ۳۷۹	Sangak - AFG4020	سنگک - ۴۰۲۰
Sangi Du Maghza Kalan	سنگی دومغزه کلان	Kaghazi - AFG4022	کاغذی - ۴۰۲۲
Sangak - AFG0517	سنگک - ۵۱۷	Kaghazi - AFG4048	کاغذی - ۴۰۴۸
Sangak - AFG0519	سنگک - ۵۱۹	Sofalak	سوفالک
Changaki	چنگاکی	Sattarbai - AFG6038	ستاربابی - ۶۰۳۸
Sangak - AFG0530	سنگک - ۵۳۰	Kaghazi - AFG6040	کاغذی - ۶۰۴۰
Sangak Kalan Daraz	سنگک کلان دراز		
Kaghazi - AFG0532	کاغذی - ۵۳۲	IMPORTED CLONES	
Sangak - AFG0533	سنگک - ۵۳۳	Nonpareil	ننپیریل
Kaghazi - AFG0534	کاغذی - ۵۳۴	Cardinal	کار دینال
Kaghazi - AFG0535	کاغذی - ۵۳۵	Carmel	کارمیل
Talkhak	تلخک	Ferragnes	فیراگنیس
Kaghazi - AFG0739	کاغذی - ۷۳۹	Ferraduel	فیرادول
Sangak - AFG0740	سنگک - ۷۴۰	Lauranne	لاوران
Sattarbai - AFG0771	ستاربابی - ۷۷۱		
Khairodini - AFG0772	خیرالدینی - ۷۷۲		

Physical Characteristics

		QUANTITATIVE CHARACTERISTICS																		QUALITATIVE CHARACTERISTICS						
PHDP Number	UPOV Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Kernel: intensity of color						
		Almond: length	Almond: width	Almond: Thickness	Almond: weight	Kernel: weight	Almond: Shape	Almond: Flatness	Almond: size	Almond: Percentage of kernel weight	Kernel: Length	Kernel: Width	Kernel Thickness	Kernel: size	Kernel: Shape	Shell: hardness	Keel: development	Shell: Intensity of color								
In situ tree	Clone name	Clone Number																								
1003	Abdul Wahidi	AFG 1003	long	medium	medium	light	medium	medium	medium	medium	broad elliptic	medium	medium	medium	medium	46%	long	narrow	thin	medium to big	narrow	hard	medium	very light	very light	brown
796	Abdul Wahidi	NR	very long	wide	thick	medium	medium	very big	small	36%	long	medium	thin	medium to big	narrow	medium	medium	medium	medium	medium to big	narrow	medium	medium	medium	medium	light brown
144	Belabai	AFG 0144	medium	very narrow	thin	very light	very small	big	big	69%	medium	narrow	thin	small to medium	narrow	very soft	weak	light	light brown	small to medium	narrow	very soft	weak	light	light brown	light brown
146	Khairodini	AFG 0146	long	wide	medium	medium	big	medium	big	49%	long	wide	thin	very big	medium	hard	strong	very light	brown	very big	medium	hard	strong	very light	very light	brown
161	Khairodini	AFG 0161	long	wide	medium	medium	big	small	big	38%	long	medium	thin	big	narrow	hard	strong	light	brown	big	narrow	hard	strong	light	light	brown
172	Khairodini	AFG 0172	long	medium	medium	medium	big	medium	big	49%	very long	wide	thin	very big	narrow	medium	medium	very light	brown	very big	narrow	medium	medium	very light	very light	brown
846	Khairodini	AFG 0846	long	wide	medium	medium	big	small	big	40%	very long	wide	thin	big to very big	narrow	medium	medium	very light	brown	big to very big	narrow	medium	medium	very light	very light	brown
147	Majidi	AFG 0147	short	narrow	medium	light	small	small	small	39%	medium	narrow	thin	small	narrow	hard	medium	very light	brown	small	narrow	hard	medium	very light	very light	brown
2010	Majidi	AFG 2010	medium	medium	medium	light	small	small	small	38%	medium	broad elliptic	medium	small	narrow	hard	weak	medium	brown	small	narrow	hard	weak	medium	medium	brown
160	Qaharbai	AFG 0160	long	medium	medium	light	medium	medium	medium	39%	medium	light	thin	small to medium	narrow	hard	medium	light	light brown	small to medium	narrow	hard	medium	light	light	light brown

QUANTITATIVE CHARACTERISTICS														QUALITATIVE CHARACTERISTICS							
In situ tree	Clone name	Clone Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
			Almond: length	Almond: width	Almond: Thickness	Almond: weight	Kernel: weight	Almond: Shape	Almond: Flatness	Almond: size	Almond: Percentage of kernel weight	Kernel: Length	Kernel: Width	Kernel Thickness	Kernel: size	Kernel: Shape	Shell: hardness	Keel: development	Shell: Intensity of color	Kernel: Intensity of color	
	PHDP Number																				
	UPOV Number												41	40	(37)	38					
143	Qambari	AFG 0143	short	narrow	very thin	very light	light	broad elliptic	flat	very small	big	72%	short	narrow	thin	small	intermediate	soft	strong	light	light brown
170	Qaharbai	AFG 0170	long	medium	medium	light	medium	broad elliptic	flat	medium	medium	53%	long	medium	thin	big	narrow	hard	medium	light	brown
1004	Qaharbai	AFG 1004	very long	medium	medium	medium	medium	elliptic	medium	big	medium	46%	long	medium	medium	big	narrow	medium	weak	light	light brown
2009	Qambari	AFG 2009	short	narrow	thin	very light	light	broad elliptic	inflated	very small	big	62%	short	narrow	medium	small	narrow	soft	medium	light	light brown
142	Sattarbai	AFG 0142	medium	narrow	thin	very light	medium	elliptic	medium	very small	big	74%	medium	narrow	medium	medium	narrow	very soft	strong	light	brown
168	Sattarbai Basher	AFG 0168	long	very narrow	very thin	very light	light	narrow elliptic	medium	very small	big	71%	long	narrow	thin	small to medium	very narrow	very soft	strong	very light	light brown
1001	Sattarbai Mamakhail	AFG 1001	long	narrow	thin	very light	light	narrow elliptic	medium	small	medium	59%	long	narrow	thin	small to medium	narrow	very soft	very strong	light	brown
159	Sattarbai Bakhmali	AFG 0159	long	narrow	thin	very light	light	narrow elliptic	medium	small	big	61%	long	narrow	thin	small to medium	very narrow	soft	strong	light	brown
2008	Sattarbai Bakhmali	AFG 2008	medium	very narrow	very thin	very light	light	elliptic	medium	very small	big	66%	medium	very narrow	thin	small	very narrow	very soft	medium	light	light brown
157	Sattarbai Guldar	AFG 0157	medium	narrow	very thin	very light	very light	narrow elliptic	medium	very small	big	60%	medium	very narrow	very thin	very small	narrow	very soft	strong	medium	light brown
2006	Sattarbai Guldar	AFG 2006	medium	narrow	very thin	very light	light	elliptic	flat	very small	big	61%	medium	very narrow	thin	very small	narrow	very soft	medium	light	cream

QUANTITATIVE CHARACTERISTICS														QUALITATIVE CHARACTERISTICS							
In situ tree	Clone name	Clone Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
			Almond: length	Almond: width	Almond: Thickness	Almond: weight	Kernel: weight	Almond: Shape	Almond: Flatness	Almond: size	Almond: Percentage of kernel weight	Kernel: Length	Kernel: Width	Kernel Thickness	Kernel: size	Kernel: Shape	Shell: hardness	Keel: development	Shell: Intensity of color	Kernel: Intensity of color	
PHDP Number UPOV Number																					
													41	40	(37)	38					
154	Sattarbai No.4	AFG 0154	medium	narrow	thin	very light	light	broad elliptic	medium	small	big	65%	medium	narrow	thin	medium	narrow	very soft	strong	light	brown
156	Sattarbai Sais	AFG 0156	medium	narrow	very thin	very light	light	elliptic	medium	very small	medium	53%	medium	very narrow	thin	small to very small	narrow	soft	weak	light	light brown
777	Sattarbai Sais	AFG 0777	medium	very narrow	thin	very light	light	narrow elliptic	inflated	very small	big	61%	long	very narrow	thin	small	very narrow	very soft	medium	medium	light brown
2011	Sattarbai Sais	AFG 2011	medium	narrow	thin	very light	light	narrow elliptic	inflated	very small	medium	53%	medium	very narrow	thin	small	very narrow	very soft	medium	medium	light brown
145	Sattarbai Sufi	AFG 0145	medium	very narrow	very thin	very light	light	narrow elliptic	medium	very small	big	73%	long	very narrow	thin	small	very narrow	very soft	weak	light	cream
162	Shokorbai	AFG 0162	short	medium	medium	light	light	broad elliptic	medium	small	small	34%	short	narrow	thin	small	narrow	hard	medium	light	brown
779	Shokorbai	AFG 0779	medium	medium	thick	medium	medium	broad elliptic	inflated	big	medium	42%	medium	narrow	thick	big to very big	narrow	hard	medium	light	brown
848	Shokorbai	AFG 0848	medium	medium	thick	medium	heavy	broad elliptic	inflated	big	medium	44%	medium	medium	thick	very big	narrow	hard	medium	light	brown
2007	Shokorbai	AFG 2007	medium	medium	thick	medium	medium	broad elliptic	inflated	medium	small	40%	medium	narrow	medium	medium to big	narrow	hard	medium	very light	light brown



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**Afghan Almond Industry
Development Organization**

Karte Char, Kabul, Afghanistan
Contact: Javid Hamidzada
javid@rootsofpeace.org
www.aaido.org.af