

# Determination of Optimum Harvest Date Window

*For*

## Citrus and Pomegranate and Postharvest Shelf Life

### Determination of Femminello Siracusano

#### 1.2 Introduction

In post-harvest physiology, we consider "mature" as "that stage at which a commodity has reached a sufficient stage of development that after harvesting and post-harvest handling, its quality will be at least the minimum acceptable to the ultimate consumer" (Reid, 1992). Based on such definition is possible to define two types of maturity:

- **Physiological maturity** – refers to a particular stage in the development of a plant or plant organ. A fruit is physiologically mature when its development is over. A physiologically mature fruit may not necessarily be commercially mature.
- **Commercial maturity** – pertains to the timing of harvest to meet specific market and consumer requirements. A fruit is commercially mature when it reaches a developmental stage at which it can be marketed for a specific purpose.

In general, maturity measurements to be carried out by producers, handlers, and quality control personnel they must be simple, readily performed in the field or inspection point, and should require relatively inexpensive equipment. The index should preferably be objective (a measurement) rather than subjective (an evaluation) and ideally, the index should be non-destructive (Dadzie et J.E. Orchard, 1997)

The maturity index must consistently meet two requirements for all growers, districts, and years: firstly, it should insure minimum acceptable eating quality and, secondly, a long storage life.

#### 1.3 Data flow and Statistical Analysis

SO4 lab team are committed insert daily collected data in the excel file and immediately revised: excel files should be daily cross-checked using random data control and using outlier statistical analysis. Daily data revision, will give the chance to re-sampling and repeat the missed or wrong data.

The final dataset will be statistically analyzed:

1. Analysis of frequency, average, standard deviation

Relation among:

- Parameters, correlation coefficients will be calculated by Pearson correlation test.
- The sampling data and HmP will be calculated using the ANOVA test with the correction of the dependences between samples.

## Shelf Life Tests

Shelf life test will be performed only for valuable marketable varieties according to the Commercial maturity definition.

**Commercial maturity** – pertains to the timing of harvest to meet specific market and consumer requirements. A fruit is commercially mature when it reaches a developmental stage at which it can be marketed for a specific purpose. , e.g. for consumption in the fresh state, or for processing. Papayas, for example, are harvested for export at the mature stage, i.e. when the fruit is firm and easy to handle. On arrival at the destination, the fruit is ripened in ripening rooms. Commercial maturity has little impact on physiological maturity.

### OHDW of CITRUS

For now we don't have the reliable data to indicate the Harvesting Mid-point of the citrus fruits available in the NC in Jalalabad, the new hired postharvest quality control expert will conduct such analysis to identify the optimum harvesting dates of the different citrus varieties. The most potential and commercial have been pinpointed after the consultation with Mr. Aziz which included but not limited to

No	Species	Accession	Variety
1	Orange	7007	Sanguinello Moscato Cuscuna
2	Orange	7002	Navelina
3	Orange	7107	Lane Late
4	Lemon	7010	Femminello Siracusano
5	Lemon	7011	Femminello Adamo
6	Mandarin	7015	Clementine Di Nules

The analysis of these specified varieties will be done in 2015 to identify the harvesting mid, optimum and late harvesting dates of these citrus varieties. The above 5 varieties have

been isolated for the maturity index identification and postharvest shelf life test. Citrus is Non-Climacteric fruits so the critical point is to harvest the citrus at the optimum maturity stage. The maturity of the citrus is mainly depends on the Color, juice content, TA, Sugar Acid Ratio and Total Soluble Content (TSC).

**Table. Citrus varieties for the Hmp identification and postharvest shelf life test**

**Year:**  
**2015**

Number	Accession Number	Varieties	Maturity Period
1	7007	Sanguinello Moscato Cuscuna	very early
2	7002	Navelina	Early
3	7107	Lane Late	Early
4	7015	Clementine Di Nules	Early
5	7011	Femminello Adamo	Early
6	7010	Femminello Siracusano	mid

**Table of harvesting period**

	=	very early
	=	Early
	=	early –mid
	=	Mid
	=	Mid-late
	=	Late
	=	Very late

As reminder are reported some definition of the different ripeness level:

1. Mature – This is when the fruit has reached physiological maturity meaning with full size and typical shape.
2. Ripe – This is when the fruit has reached the point where the eating quality is best.
3. Overripe – This is the state after ripeness where breakdown of starches and firmness render the product unpalatable often combined with the onset of off taints due to fermentation.

Applying the definition to citrus:

- Mature- when the color is fully developed.
- Generally citrus ripe harvesting period last for longer for three weeks once picked
- The apricots ripe harvesting period will not generally last more than four days once picked.
- Changes occurred in citrus (e.g. conversion of starch into sugars, changes in organic acids, proteins and fats) can cause serious post-harvest losses.

The optimum harvesting period of the citrus is very critical which set the final possible market reachable by such varieties in specific storage condition. If harvested too soon there is a detrimental effect on taste, sugar levels and coloration. If harvested too late the quality is drastically reduced and the possibility of post-harvest losses increase exponentially.

The different and specific performances of each single accession of citurs should be investigated. The goals of citrus trials can be summarize as follow:

1. Definition of Optimum Harvest Date Window for batch of 5 commercial varieties
2. Post-Harvest Tests and maximum storage period.

### **Definition of Optimum Harvest Date Window**

The optimum harvesting parameters for the citrus varieties as follow:

For the Sanguinello Moscato Cuscuna, Navelina, Lane Late, Clementine Di Nules varieties

1. high (>8%) soluble solids content (SSC)
2. Moderate acidity (0.6 to 1.0%)
3. Juice content (up to 30%)
4. Sanguinello Moscato Cuscuna, Navelina, Lane Late, Clementine Di Nules with 7 to 8 pound- force rind firmness are considered to be consumed

While for the Femminello Adamo and Femminello Siracusano having

1. High (>6%) soluble solids content (SSC)
2. High acidity (6 to 7%)
3. Juice content (Varies from 30 to 35% approximately )
4. Femminello with 7 to 8 pound- force rind firmness are considered to be consumed

Other relevant maturity index for citrus are;

5. Skin colour, the skin colour is very critical instruments to identify the maturity indices of the certain citrus varieties while for the some varieties the skin color is very

prominent parameter to identify the maturity of some varieties

6. Size, the size of the citrus is also very important instruments to assess the maturity indices of citrus, some citrus reach to a specific size when it is fully matured

## 1.4 Materials and Methods

For the identification of the maturity indices of several citrus varieties in the National Collection Center in Jalalabad, the selected varieties will be harvested at different date of maturation to identify the best harvesting and build the citrus maturation calendar.

## 1.5 Sampling

The citrus fruits will be collected from the citrus orchard at different harvesting date, at each observation the fruits will be collected by having uniformity in size, color and quality. The concept of the Harvesting mid-point should be considered during the trail which is defined HmP is defined as the moment in which the 50 % of the fruits reach the maturity.

### Sampling procedure for the citrus varieties included in the National Collection Jalalabad:

The pre identifies varieties will be tested in 2015 which are given in the Table.1. The first column represent the list of the varieties while the second column represent the estimated harvesting date of the citrus varieties. Based on the research and recommendation the SO4 team have selected the below varieties having good quality and producing high fruits yields. These 6 varieties have been selected from the 60 varieties grown in the National Collection Jalalabad.

**Table 1. 2015 Proposed Citrus Varieties**

S/N	Varities	National Reference
1	Sanguinello Moscato Cuscuna 7007	21/11/2014
2	Navelina 7002	25/11/2014
3	Lane Late 7107	24/11/2014
4	Clementine Di Nules 7015	20/11/2014
5	Femminello Adamo 7011	20/11/2014
6	Femminello Siracusano 7010	01/12/2014

Sampling	
# Levels	Non Climacteric
HI	-15 days before Hmp

<b>H2</b>	-10 days before Hmp
<b>H3</b>	-5 days before Hmp
<b>H4</b>	At Hmp
<b>H5</b>	+15 days after Hmp
<b>H6</b>	+10 days after Hmp

**Table 2. Sampling Calendar**

The sample will be harvested at different intervals as indicated in the table 2. Due to limitation of the trees and fruits, the sample will be harvested randomly from specific trees having good appearance and uniformity in quality. As the trees of each varieties are already in lined in National Collection Jalalabad so only those fruits will be harvested for the sampling that good qualities.

## 1 Analytical Determination

All the 6 potential varieties will be tested both organoleptically and physicochemically at the different intervals indicated in table 2. During each analysis the fruits will be analyzed for the below parameter

- Avg. Weight (g)
- Rind Color
- Rind Texture (kg)
- %Juice
- pH
- Acidity (%)
- Total soluble content
- S/A Ratio

All the data will be recorded in the excel file and will be analyzed statistically at the end of the analysis to identify the best picking time and optimum maturity date different citrus varieties.

**Table 3. Maturity index Trial Prospective per accession per level**

Maturity index Trial Prospective per accession per level		
<i>Sampling Levels</i>	=	6
<i>Number of observation</i>	=	6
<i>Number of fruits per observation</i>	=	8

Total Fruits for Maturity index trail	=	288
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## Description of the Methods

The method's descriptions for: SSC, TA, Firmness, Height, Diameter and Weight, color, are reported in the Pomology Laboratory Manual prepared by Mrs. Monica and Mr. Cullen.

## Citrus shelf life test

Due to the limitation of the citrus fruits availabilities we cannot analyzed the shelf life studies of all the citrus varieties, so it was concluded that for this year we will analyzed the shelf life studies of Femminello Adamo only and will extend the rest shelf life studies to 2016. The sample will be stored at different storage condition such as

- Storage level 1: at Room Temperature (25 °C)
- Storage level 2: at 10 to 12 °C and 90 to 95 % Relative Humidity

All the samples will be analyzed after every 15 days for the total of 120 days.

**Table 4. Storage levels description**

Storage levels description	
# Levels	Femminello Siracusano
Storage Level 1	Room temperature (25°C).
Storage Level 2	10 to 12 °C +RH 90 to 95 %

**Table 5. Storage evaluation description**

Storage evaluation date		
Time for Harvest (days)	# Levels	Femminello Siracusano
T=0		Sampling
T=0+15	PH1	15 days after harvesting
T=0+30	PH2	30 days after harvesting
T=0+45	PH3	45 days after harvesting
T=0+60	PH4	60 days after harvesting
T=0+75	PH5	75 days after harvesting

T=0+90	PH6	90 days after harvesting
T=0+105	PH7	105 days after harvesting
T=0+120	PH8	120days after harvesting

## Procedure

- Harvest the fruits randomly and keep it at shade before it undergoes other postharvest treatments
- Remove dirt's, damage and defects sample from the lots
- Wash the fruits with clean water along with chlorinate and sodium bicarbonate to minimize the load of microorganism
- Dry the fruits and apply the fungicide in treated water
- Dry the fruits again and apply the wax
- Dry the sample and stored at the proposed storage condition
- Analyze all the sample after every 15 days for the total of 4 months
- Record if sample is spoiled during the trail

**Table 6. Storage evaluation date**

Storage evaluation date	T=15	T=30	T=45	T=60	T=75	T=90	T=105	T=120
Tested after	after 15 days	after 30 days	after 45 days	after 60 days	after 75 days	after 90 days	105 days after	120 days after

**Table 7. Numbers of fruits required for the PH Trail**

PH Trial Prospective per accession (per single harvesting date)		
<i>Variety</i>	=	1
<i>Treatments</i>	=	2
<i>Number of observation</i>	=	8
<i>Number of sample per observation</i>	=	12
<b>Total Fruits for PH test</b>	=	192



For the PH studies all the sample will be collected on the t=0 days and will stored at the proposed time.

## Citrus Work Plan

Below is the work plan for the citrus different varieties for Maturity Indices and Postharvest Test

S/N	Varieties	National Reference
1	Sanguinello Moscato Cuscuna 7007	21 November
2	Navelina 7002	25 November
3	Lane Late 7107	24 November
4	Clementine Di Nules 7015	20 November
5	Femminello Adamo 7011	20 November
6	Femminello Siracusano 7010	01 December

### Accession: Sanguinello Moscato Cuscuna

Sanguinello Moscato Cuscuna			
HmP			
Sampling Levels	Name of Harvesting	Data	Indication
T=0	H1	01/11/2015	-15 days before HmP
T=5	H2	10/11/2015	-10 days before HmP
T=10	H3	15/11/2015	-5 days before HmP
T=15	H4	21/11/2015	At HmP
T=30	H5	1/12/2015	+ 10 days after HmP
T=45	H6	6/12/2015	+15 days after HmP

Maturity Index Sampling Date Sanguinello Moscato Cuscuna					
-15 days before HmP	-10 days before HmP	-5 days before HmP	At HmP	+10 days before HmP	+15 days before HmP
H1	H2	H3	H4	H5	H6

<b>1/11/2015</b>	10/11/2015	15/11/2015	21/11/2015	1/12/2015	6/12/2015
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### Accession: Navelina

HmP Navelina			
Sampling Levels	Name of Harvesting	Data	Indication
T=0	H1	07/11/2015	-15 days before HmP
T=5	H2	11/11/2015	-10 days before HmP
T=10	H3	18/11/2015	-5 days before HmP
T=15	H4	25/11/2015	At Hmp
T=30	H5	5/12/2015	+ 10 days after HmP
T=45	H6	12/12/2015	+15 days after Hmp

Maturity Index Sampling Date Navelina					
-15 days before HmP	-10 days before HmP	-5 days before HmP	At Hmp	+10 days before HmP	+15 days before HmP
H1	H2	H3	H4	H5	H6
<b>07/11/2015</b>	11/11/2015	18/11/2015	25/11/2015	5/12/2015	10/12/2015

### Accession: Lane Late

HmP Lane Late			
Sampling Levels	Name of Harvesting	Data	Indication
T=0	H1	07/11/2015	-15 days before HmP
T=5	H2	11/11/2015	-10 days before HmP
T=10	H3	18/11/2015	-5 days before HmP
T=15	H4	24/11/2015	At Hmp
T=30	H5	5/12/2015	+ 10 days after HmP

T=45	H6	9/12/2015	+15 days after Hmp
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Maturity Index Sampling Date Lane Late					
-15 days before HmP	-10 days before HmP	-5 days before HmP	At Hmp	+10 days before HmP	+15 days before HmP
H1	H2	H3	H4	H5	H6
07/11/2015	11/11/2015	18/11/2015	24/11/2015	5/12/2015	9/12/2015

#### Accession: Clementine Di Nules

HmP	Clementine Di Nules		
Sampling Levels	Name of Harvesting	Data	Indication
T=0	H1	31/10/2015	-15 days before HmP
T=5	H2	07/11/2015	-10 days before HmP
T=10	H3	16/11/2015	-5 days before HmP
T=15	H4	22/11/2015	At Hmp
T=30	H5	02/12/2015	+ 10 days after HmP
T=45	H6	07/12/2015	+15 days after Hmp

Maturity Index Sampling Date Clementine Di Nules					
-15 days before HmP	-10 days before HmP	-5 days before HmP	At Hmp	+10 days before HmP	+15 days before HmP
H1	H2	H3	H4	H5	H6
31/10/2015	07/11/2015	16/11/2015	22/11/2015	02/12/2015	07/12/2015

**Accession: Femminello Adamo**

HmP			
Sampling Levels	Name of Harvesting	Data	Indication
T=0	H1	31/10/2015	-15 days before HmP
T=5	H2	07/11/2015	-10 days before HmP
T=10	H3	16/11/2015	-5 days before HmP
T=15	H4	22/11/2015	At Hmp
T=30	H5	02/12/2015	+ 10 days after HmP
T=45	H6	07/12/2015	+15 days after Hmp

Maturity Index Sampling Date <b>Femminello Adamo</b>					
-15 days before HmP	-10 days before HmP	-5 days before HmP	At Hmp	+10 days before HmP	+15 days before HmP
H1	H2	H3	H4	H5	H6
31/10/2015	07/11/2015	16/11/2015	22/11/2015	02/12/2015	07/12/2015

**Accession: Femminello Siracusano**

HmP			
Sampling Levels	Name of Harvesting	Data	Indication
T=0	H1	15/11/2015	-15 days before HmP
T=5	H2	20/11/2015	-10 days before HmP
T=10	H3	26/11/2015	-5 days before HmP
T=15	H4	01/12/2015	At Hmp
T=30	H5	12/12/2015	+ 10 days after HmP
T=45	H6	19/12/2015	+15 days after Hmp

Maturity Index Sampling Date <b>Femminello Siracusano</b>					
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<b>-15 days before HmP</b>	<b>-10 days before HmP</b>	<b>-5 days before HmP</b>	<b>At Hmp</b>	<b>+10 days before HmP</b>	<b>+15 days before HmP</b>
<b>H1</b>	<b>H2</b>	<b>H3</b>	<b>H4</b>	<b>H5</b>	<b>H6</b>
<b>15/11/2015</b>	20/11/2015	26/11/2015	01/12/2015	12/12/2015	19/12/2015

<b>PH Sampling Date Femminello Siracusano</b>
<b>H4</b>
<b>01/12/2015</b>

<b>Post-Harvest analyzing Date Femminello Siracusano</b>
<b>PH1 on 15/12/2015</b>
<b>PH2 on 30/12/2015</b>
<b>PH3 on 16/01/2016</b>
<b>PH4 on 30/01/2016</b>
<b>PH5 on 15/02/2016</b>
<b>PH6 on 01/03/2016</b>
<b>PH7 on 15/03/2016</b>
<b>PH8 on 29/03/2016</b>

## OHDW of Pomegranate

For the pomegranate Hmp has not yet determine in the Jalalabad National Collection center, however the team has some rough data regarding the harvesting date of the pomegranate which can be utilized to confirm Hmp and creation of Optimum Harvest Date Window (OHDW) for 5 pomegranate varieties. The most potential and commercial have been pinpointed after the consultation with Mr. Aziz which included Lal Baqli Dana, Wonderful, Sumbarskii, Mayatadzhy and Ariana. The analysis of these varieties well be done in the PHDP laboratory in Jalalabad to confirm the HMP and determination of optimum harvesting Date window.

**Table 1. 2104 pomegranate HmP**

<b>Year 2015</b>	
<b>Varieties</b>	<b>Harvesting date</b>
<b>Lal Baqli Dana- 4067</b>	08/10/2014
<b>Wonderful-7163</b>	07/10/2014
<b>Sumbarskii-7178</b>	07/10/2014
<b>Mayatadzhy-7179</b>	07/10/2014
<b>Ariana-7176</b>	07/10/2014

As reminder are reported some definition of the different ripeness level:

1. Mature – This is when the fruit has reached physiological maturity meaning with full size and typical shape.
2. Ripe – This is when the fruit has reached the point where the eating quality is best.
3. Overripe – This is the state after ripeness where breakdown of starches and firmness render the product unpalatable often combined with the onset of off taints due to fermentation.

Applying the definition to citrus:

- Mature- when the color is fully developed.
- Generally pomegranate ripe harvesting period last for longer for two weeks once picked
- The apricots ripe harvesting period will not generally last more than four days once picked.
- Changes occurred in pomegranate (e.g. conversion of starch into sugars, changes in organic acids, proteins and fats) can cause serious post-harvest losses.

The optimum harvesting period of the citrus is very critical which set the final possible market reachable by such varieties in specific storage condition. If harvested too soon there is a detrimental effect on taste, sugar levels and coloration. If harvested too late the quality is drastically reduced and the possibility of post-harvest losses increase exponentially.

The different and specific performances of each single accession of pomegranate should be investigated. The goals of citrus trials can be summarize as follow:

1. Confirmation of Hmp
2. Definition of Optimum Harvest Date Window for batch of 5 commercial varieties

## **Definition of Optimum Harvest Date Window**

The optimum harvesting parameters for the pomegranate varieties as follow:

1. high (>12%) soluble solids content (SSC) depends upon the cultivar
2. Moderate acidity (0.6 to 1.5%) depends upon the cultivar
3. Juice content (up to 25%) depends upon the cultivar

Other relevant maturity index for pomegranate are;

4. Skin colour, the skin colour is very critical instruments to identify the maturity indices of the certain citrus varieties while for the some varieties the skin color is very prominent parameter to identify the maturity of some varieties
5. Size, the size of the pomegranate is also very important instruments to assess the maturity indices of pomegranate, some pomegranate reach to a specific size when it is fully matured

## **1.6 Materials and Methods**

For the identification of the maturity indices of specified pomegranate varieties in the National Collection Center in Jalalabad, the selected varieties will be harvested at different date of maturation to identify the best harvesting and build the citrus maturation calendar.

## **1.7 Sampling**

The pomegranate fruits will be collected from the pomegranate orchard at different harvesting date, at each observation the fruits will be collected by having uniformity in size, color and quality. The concept of the Harvesting mid-point should be considered during the trail which is defined HmP is defined as the moment in which the 50 % of the fruits reach the maturity.

### **Sampling procedure for the pomegranate varieties included in the National Collection Jalalabad:**

The pre identifies varieties will be tested in 2015 which are given in the Table.1. The first column represent the list of the varieties while the second column represent the estimated harvesting date of the citrus varieties. Based on the research and recommendation the SO4 team have selected the below varieties having good quality and producing high fruits yields. These 5 varieties have been selected from several pomegranate varieties grown in National Collection Jalalabad.

**Table 2. 2015 Proposed Pomegranate Varieties**

S/N	Varieties	National Reference
1	Lal Baqli Dana- 4067	08/10/2014
2	Wonderful-7163	07/10/2014
3	Sumbarskii-7178	07/10/2014
4	Mayatadzh-7179	07/10/2014
5	Ariana-7176	07/10/2014

**Table 3. Sampling Calendar**

Sampling	
# Levels	Non Climacteric
H1	-15 days before Hmp
H2	-10 days before Hmp
H3	-5 days before Hmp
H4	At Hmp
H5	+15 days after Hmp
H6	+10 days after Hmp

The sample will be harvested at different intervals as indicated in the table 3. The fruits will be harvested randomly from specific trees having good appearance and uniformity in quality. As the trees of each varieties are already in lined in National Collection Jalalabad so only those fruits will be harvested for the sampling that having good qualities and appearance.

## 2 Analytical Determination

All the 5 potential varieties will be tested both organoleptically and physicochemically at the different intervals indicated in table 3. During each analysis the fruits will be analyzed for the below parameter

- Avg. Weight (g)
- Color
- firmness (kg)
- %Juice
- pH
- Acidity (%)
- Total soluble content

All the data will be recorded in the excel file and will be analyzed statistically at the end of the analysis to identify the best picking time and optimum maturity date window of different pomegranate varieties.



**Table 4. Maturity index Trial Prospective per accession per level**

Maturity index Trial Prospective per accession per level		
<i>Sampling Levels</i>	=	5
<i>Number of observation</i>	=	6
<i>Number of fruits per observation</i>	=	6
<b>Total Fruits for Maturity index trail</b>	=	<b>180</b>

## Description of the Methods

The method's descriptions for: SSC, TA, pH Firmness, Weight and color, are reported in the Pomology Laboratory Manual prepared by Mrs. Monica and Mr. Cullen.

## Pomegranate Work Plan 2015

Below is the work plan for the Pomegranate varieties for Hmp and OHDW

S/N	Varieties	National Reference
1	Lal Baqli Dana- 4067	08/10/2014
2	Wonderful-7163	07/10/2014
3	Sumbarskii-7178	07/10/2014
4	Mayatadzhly-7179	07/10/2014
5	Ariana-7176	07/10/2014

The Calendar has been designed to avoid working on Thursday and Friday

## Accession: Lal Baqli Dana

HmP Lal Baqli Dana			
Sampling Levels	Name of Harvesting	Data	Indication
T=0	H1	09/13/2015	-15 days before HmP
T=5	H2	23/09/2015	-10 days before HmP
T=10	H3	03/10/2015	-5 days before HmP
T=15	H4	08/10/2015	At Hmp
T=30	H5	18/10/2015	+ 10 days after HmP
T=45	H6	03/11/2015	+15 days after Hmp

Maturity Index Sampling Date <b>Lal Baqli Dana</b>					
-15 days before HmP	-10 days before HmP	-5 days before HmP	At Hmp	+10 days before HmP	+15 days before HmP
H1	H2	H3	H4	H5	H6
09/13/2015	23/09/2015	03/10/2015	08/10/2015	18/10/2015	03/11/2015

#### Accession: Wonderful

HmP Wonderful			
Sampling Levels	Name of Harvesting	Data	Indication
T=0	H1	09/13/2015	-15 days before HmP
T=5	H2	26/09/2015	-10 days before HmP
T=10	H3	30/09/2015	-5 days before HmP
T=15	H4	07/10/2015	At Hmp
T=30	H5	17/10/2015	+ 10 days after HmP
T=45	H6	24/10/2015	+15 days after Hmp

Maturity Index Sampling Date <b>Wonderful</b>					
-15 days before HmP	-10 days before HmP	-5 days before HmP	At Hmp	+10 days before HmP	+15 days before HmP
H1	H2	H3	H4	H5	H6
09/13/2015	26/09/2015	30/09/2015	07/10/2015	17/10/2015	24/10/2015

#### Accession: Sumbarskii

HmP Sumbarskii			
Sampling Levels	Name of Harvesting	Data	Indication

T=0	H1	09/12/2015	-15 days before HmP
T=5	H2	26/09/2015	-10 days before HmP
T=10	H3	30/09/2015	-5 days before HmP
T=15	H4	07/10/2015	At Hmp
T=30	H5	17/10/2015	+ 10 days after HmP
T=45	H6	24/10/2015	+15 days after Hmp

Maturity Index Sampling Date <b>Sumbarskii</b>					
-15 days before HmP	-10 days before HmP	-5 days before HmP	At Hmp	+10 days before HmP	+15 days before HmP
H1	H2	H3	H4	H5	H6
09/12/2015	26/09/2015	30/09/2015	07/10/2015	17/10/2015	24/10/2015

#### Accession: Mayatadzhy

HmP	Mayatadzhy		
Sampling Levels	Name of Harvesting	Data	Indication
T=0	H1	09/12/2015	-15 days before HmP
T=5	H2	26/09/2015	-10 days before HmP
T=10	H3	30/09/2015	-5 days before HmP
T=15	H4	07/10/2015	At Hmp
T=30	H5	17/10/2015	+ 10 days after HmP
T=45	H6	24/10/2015	+15 days after Hmp

Maturity Index Sampling Date <b>Mayatadzhy</b>					
-15 days before HmP	-10 days before HmP	-5 days before HmP	At Hmp	+10 days before HmP	+15 days before HmP
H1	H2	H3	H4	H5	H6
09/12/2015	26/09/2015	30/09/2015	07/10/2015	17/10/2015	24/10/2015

**Accession: Ariana**

HmP		Ariana	
Sampling Levels	Name of Harvesting	Data	Indication
T=0	H1	09/13/2015	-15 days before HmP
T=5	H2	22/09/2015	-10 days before HmP
T=10	H3	04/10/2015	-5 days before HmP
T=15	H4	10/10/2015	At Hmp
T=30	H5	19/10/2015	+ 10 days after HmP
T=45	H6	26/10/2015	+15 days after Hmp

Maturity Index Sampling Date Ariana					
-15 days before HmP	-10 days before HmP	-5 days before HmP	At Hmp	+10 days before HmP	+15 days before HmP
H1	H2	H3	H4	H5	H6
09/13/2015	22/09/2015	04/10/2015	10/10/2015	19/10/2015	26/10/2015