

# Young & Mature Horticulture Fruit Crops Mapping of Adampur and Hisar-IInd Blocks of Hisar District Using On Screen Visual Interpretation Approach on WV-2 Data

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## ABSTRACT

Horticulture generally refers to the agriculture of growing of fruit crops, usually on a large scale. Over the years, horticulture has emerged as one of the potential agricultural enterprise in accelerating the growth of economy. The state has a rich diversity of horticultural crops due to the presence of diverse agro-climatic zones ranging from sub-tropical and semi-arid to sub-humid. In the present investigation showing the Young and Mature Horticultural fruit Crops in Adampur and Hisar-IInd development blocks of Hisar district on the satellite data of World View-2 (March to Dec., 2011) and IRS-P6-LISS-III (Feb., 2011) multi-spectral satellite data. The software used ArcMap GIS 9.3, Geomatica 10.3, EARDAS 9.3, MS Office & Excel 2007 for this research mapping and presentation. In the methodology there are used On Screen visualization Approach. In On screen visualization, Data mosaicing, Area extraction, On screen digitization, G T collection, Area computation, final Map composition. The total area under horticultural crops was 7, 865 hectares during 1966-67, which had increased to 45, 910 hectares by the end of 2010-11 of whole Haryana state. Citrus is the major crop of the study area followed by Guava, kinnu and anola. According to this investigation the total area under which horticulture fruit crops block level that are 506.23 hec. Of Adampur block and 445.88 hec. area of Hisar II block and total area of both blocks are 952.11 hec. through on screen visualization. In Total horticulture crops area is categorized in two categories i.e. Young and Mature/Old crops. Young horticulture crops recorded 310.07ha while old crops area was slightly higher 642.04 ha. Out of total area 67% area is under mature horticulture crops and 33% under Young horticulture crops.

## 1. INTRODUCTION

Agriculture plays a vital role in the Indian economy. Over 70 percent of the rural households depend on agriculture as their principal means of livelihood. Agriculture along with fisheries and forestry accounts for one third of the nation's Gross Domestic Product (GDP) and is its single largest contributor. The term "Horticulture" which is a part of agriculture is concerned with the raising of so called garden crops. At present, fruits, vegetables, flowers etc. are grown not only with in the backyards, but also in large areas in open fields on a commercial scale. Traditionally garden crops include fruits, vegetables and flowers. But today's horticulture deals not only the fruits, vegetables and flowers but also other important crops like spices, condiments, plantation crops, medicinal and aromatic plants etc. Besides cultivation of these crops, present day horticulture deals with the utilization and improvement of these crops. India has made a fairly good progress on the horticulture scenario of the world. The major crops in case of fruits are mango, banana, citrus, apple, and pineapple and in case of vegetables are potato, onion, tomato and other seasonal vegetable. Out of the total percentage of Agro Exports, fruits, vegetables, flowers and processed products contribute only 5.59%. It has been estimated that the postharvest losses of horticulture produce are very substantial which needs urgent attention. It plays an important role in country's nutritional

security as well, including poverty alleviation and employment generation. (*Report of the Working Group On Horticulture Development for The Tenth Five year Plan June, 2001*).

Remote Sensing is one of the emerging advanced tools together accurate information on many parameters required for development of horticulture sector. A large number of remote sensing applications projects carried out in the country have proved the pre-eminence achieved by India in utilizing the remote sensing technology in different facets of natural resources management and development. A number of studies have been carried out in the field of plantation, aiming at identification of crop, area estimation, condition assessment etc. using Indian Remote Sensing Satellite (IRS) data. (Dr. Sushma Panigrahy et al,2008)

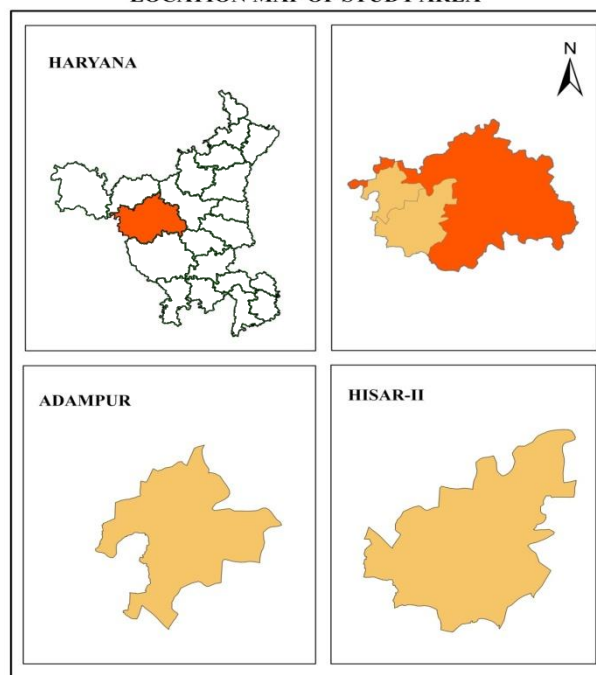
#### OBJECTIVES OF STUDY:

- Mapping of Horticultural site in the given study area using WORLD VIEW-2 Data.
- Mapping of Young and Mature horticultural crops in study area using on screen visualization approach.

#### 2. STUDY AREA

The present study proposes the horticulture mapping of the two block of district Hisar which is one of the district of Haryana state. The district has HisarI, HisarII, Hansi, Narnaund and Adampur block. Here we study only two blocks namely Hisar II and Adampur. The Hisar district, a part of the IndoGenetic alluvial plain is situated between  $28^{\circ}53'45''$  to  $29^{\circ}49'15''$  N latitudes and  $75^{\circ}13'15''$  to  $76^{\circ}18'15''$  E longitudes. It occupies an area of 3983 sq.km. and is bordered on the east by Rohtak district, on the west by Fatehabad district & Rajasthan state, on the south by Bhiwani district and on the north by Jind district

LOCATION MAP OF STUDY AREA



#### 3. MATERIAL & METHODOLOGY

For doing any research work various kinds of data are required for fulfil our research purposes. Therefore various kinds of data were used in study which is briefly described below:

##### 3.1. SATELLITE DATA

Remote sensing data is the basic data source for Plantation mapping of the study area. World view-2 data is used for the present study applying onscreen visual interpretation World view-2 sensor provide 2 meter spatial resolution data with 8 bands .

##### 3.2. ANCILLARY DATA

1. Administrative boundary (district & blocks).
2. Statistics at district & blocks level of Dept. of Forest
3. In season collected ground truth data.

##### 3.3. SOFTWARE USED

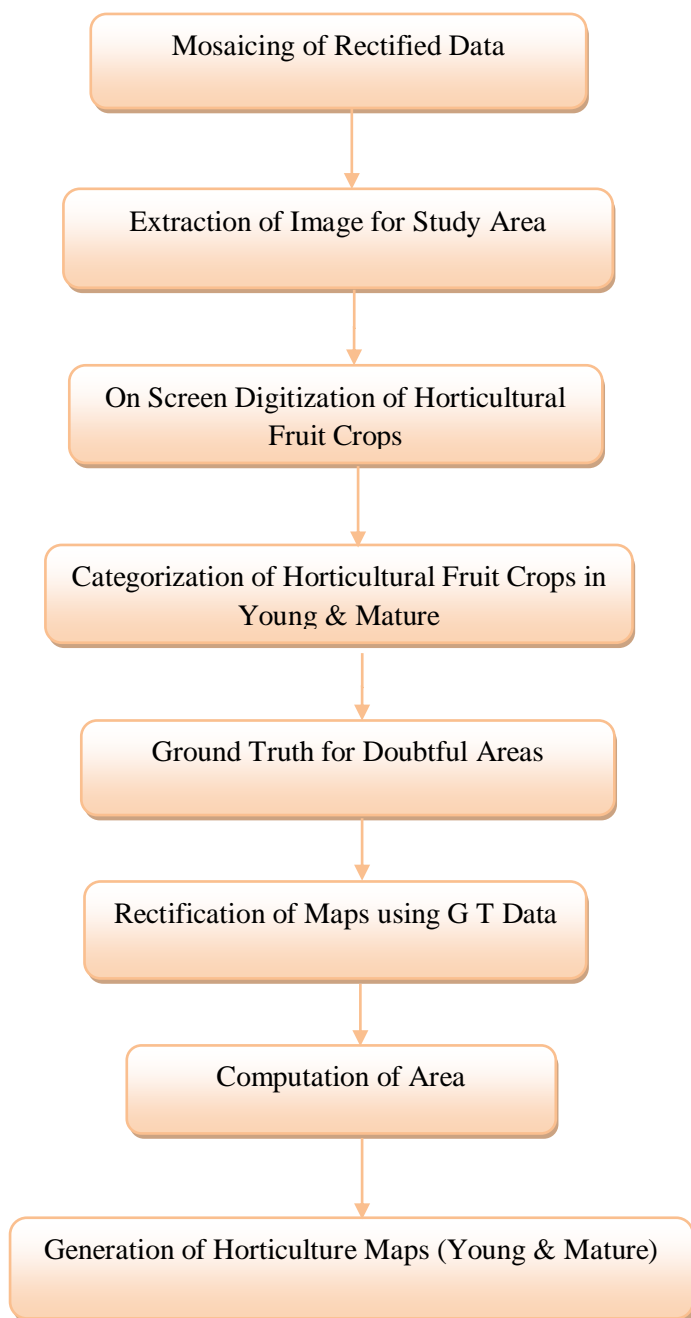
3.3.1. ERDAD IMAGINE 9.1: In this study ERDAS was applied in importing image subsetting, mosaicing, Geo-referencing and image rectification.

3.3.2. ARC-GIS 9.3: This software was used for visual interpretation and map composition.

3.3.3. MS OFFICE 2007: For the current study we use Microsoft Office in Report & Graph generation.

### 3.4. METHODOLOGY

Figure: 3.1 Methodology flow chart of visual Interpretation



### 4. RESULT & DISCUSSION

Horticulture fruit crops mapping were done for Hisar-II and Adampur blocks of Hisar district. On available data World View-2, 8 band multispectral data having spatial resolution 2 meter was explored to assess the best dataset for such type of studies. Single analysis approaches onscreen visual

interpretation using high resolution World View- 2 data explored and the results from this approach was compared.

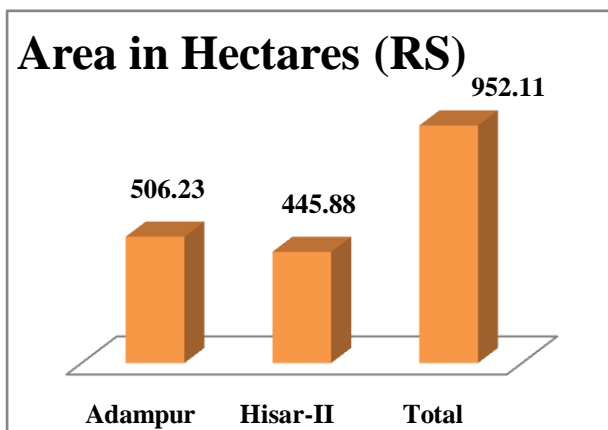
#### 4.1 HORTICULTURE FRUIT CROPS AREA MAPPING USING ON SCREEN VISUAL INTERPRETATION APPROACH

Geo-referenced World View-2 multispectral data was mosaiced and study area blocks were extracted after overlying administrative boundaries. Digital data was displayed and horticulture fruit crops area was delineated. Different enhancements techniques were used to identify horticulture fruit crops. Citrus is the major crop of the study area followed by Guava, kinnu and anola. As the area of Guava, kinnu and anola is insignificant and spectral signatures are similar to Citrus hence cannot be separated. Block wise area of horticulture fruit crops given in Table 4.1 and in Figure 4.1. Spatial distribution of fruits crops depicted in Map 4.1. Total horticultural fruit crops area derived in the study blocks using remote sensing data is 952.11 hectares. The total horticulture fruit crops area in the study blocks is 952.23ha. Concentration of Horticulture fruit crops area is more in Adampur block having 506.23 ha. Area is significantly higher as compared to Hisar-II 445.88 ha. RS based horticulture fruit crops area at block level compared with the area provided by Dept. of Horticulture (DOH) for the same year i.e. 2011

Table 4.1. Horticultural fruit crops area in different blocks of Hisar district

Horticulture Fruit Crops Area	Area in Hectares (RS)
Adampur	506.23
Hisar-II	445.88
<b>Total</b>	<b>952.11</b>

**Figure 4.1: Horticultural fruit crops area in different blocks of Hisar district**

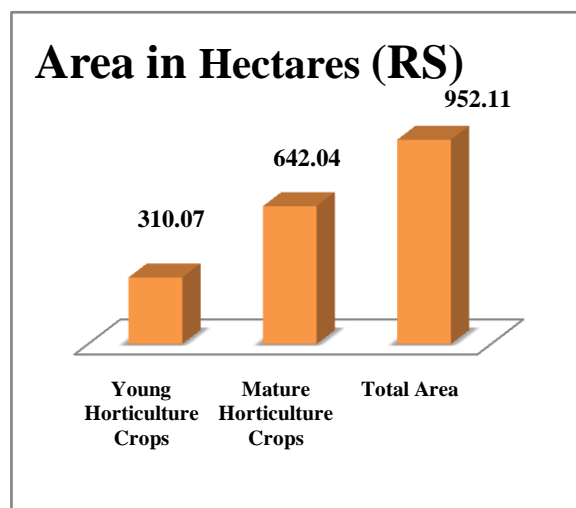


Total horticulture crops area is also categorized in two categories i.e. Young and Mature/Old crops. Young horticulture crops recorded 310.07ha while old crops area was slightly higher 642.04 ha. Out of total area 67% area is under mature horticulture crops and 33% under Young horticulture crops. Category wise area is given in Table 4.2 and in Figure 4.2 and depicted in Map 4.2

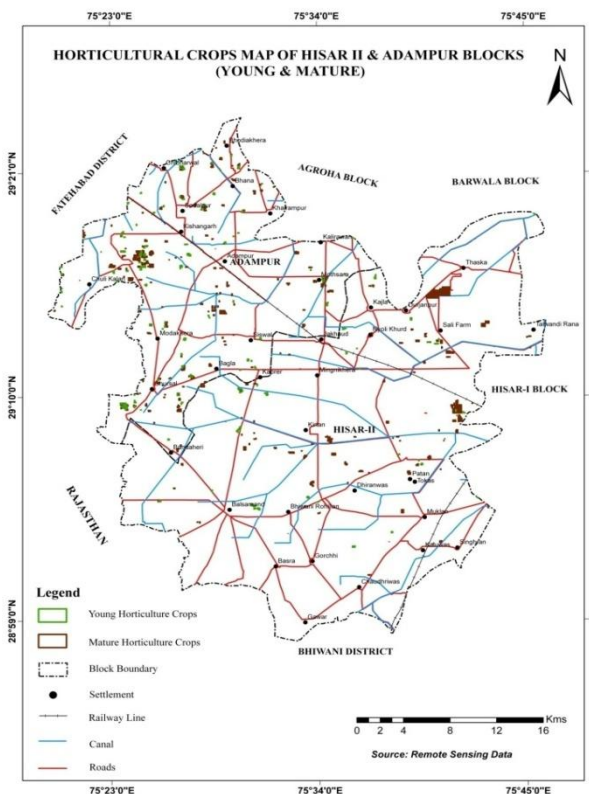
**Table 4.2 Area under Different Categories of Horticultural Fruit crops in the Study Area**

Horticulture	Area in Hectares (RS)
Young Horticulture Crops	310.07
Mature Horticulture Crops	642.04
<b>Total Area</b>	<b>952.11</b>

**Figure 4.2 Area under Different Categories of Horticultural Fruit crops in the Study Area**



**Map 4.2: Area under Different Categories of Horticultural Fruit Crops in the Study Area**



**4.3 Young and Mature Horticultural Fruit Crops in Adampur Block**

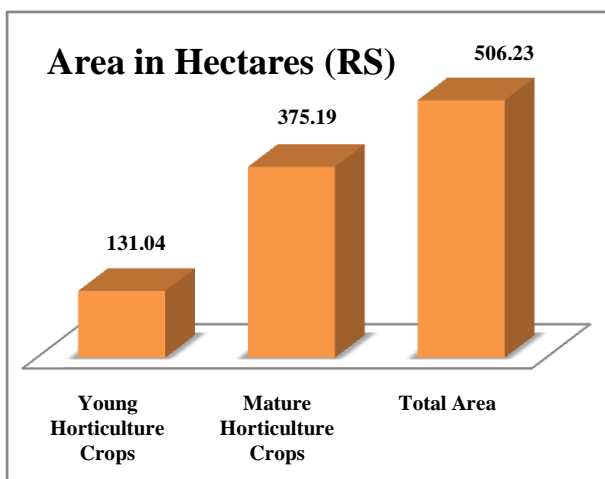
The total geographical area of Adampur block is 298.84 sq. km. The total Area under horticulture fruit crops in Adampur block is 506.23 hectares. Total horticulture fruit crops area given in Table 4.3 and Figure 4.3. The Area under horticulture fruit crops is only

1.69% of the total geographic area. Citrus is one of the major crops in this block. Guava and anola are also grown in some areas. Horticulture fruit crops are evenly spread throughout the block. Total 506.23 ha area of Horticulture crops was recorded in the block. Out of this 26% area (131.44ha) comes under young and 74% (375.59 ha) comes under mature Horticulture Crops. The spatial distribution of category-wise horticulture crops is depicted in Map 4.3.

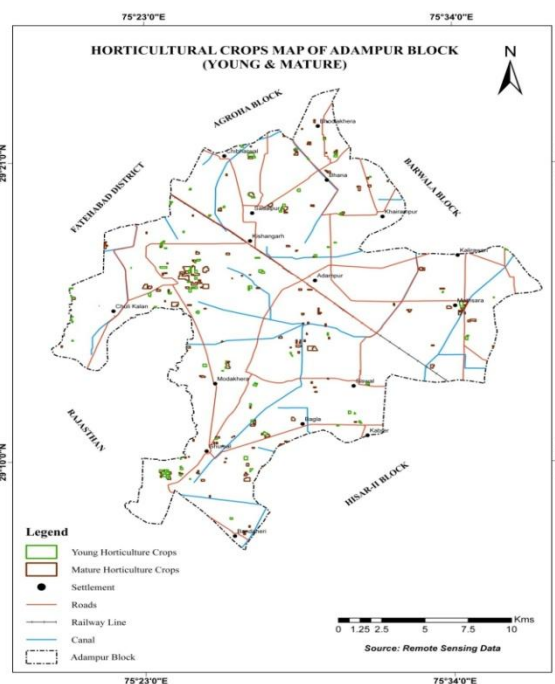
**Table 4.3. Area under Different Categories of Horticulture Crops in Adampur block**

Horticulture Crops	Area in Hectares (RS)
Young Horticulture Crops	131.44
Mature Horticulture Crops	375.59
<b>Total Area</b>	<b>506.23</b>

**Figure 4.3 Area under Different Categories of Horticulture Crops in Adampur block**



**Map 4.3 Horticulture Fruit Crops Mapping of Adampur Block**



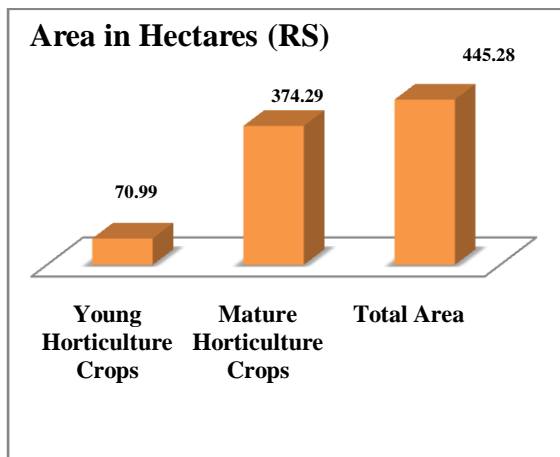
#### 4.4 Young and Mature Horticultural Fruit Mapping of Hisar-II Block

The total geographical area of Hisar-II block is 781.02sq.km. The Area under Horticulture Fruit Crops is 445.88 ha. The Area under horticulture fruit crops is only 0.57% of the total geographic area of the block. In Hisar-II block, major area of the horticulture fruit crops is concentrated in eastern part. Total horticulture fruit crops area given in Table 4.4 and Figure 4.4. Citrus is one of the major crops in this area. Ber, Guava and Grapes are also grown in some area. These villages are well connected with metalled roads. The main reasons of large area under horticulture fruit crops may be the agro-climatic condition, soil structure and availability of fresh water and market for the growers. Out of total area 16 % area (70.99 ha) comes under young and 84 (374.29ha) comes under mature horticulture fruit crops. The spatial distribution of category-wise horticulture crops is depicted in Map 4.4.

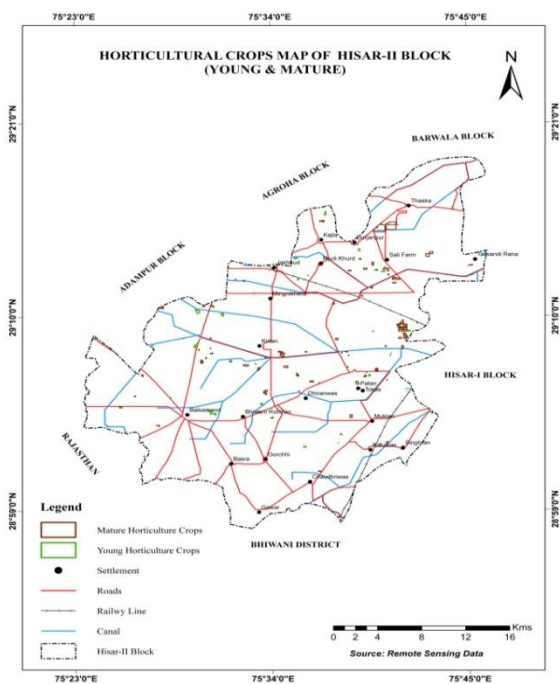
**Table 4.4 Area under Different Categories of Horticulture Crops in Hisar-II block**

Horticulture Crops	Area in Hectares (RS)
Young Horticulture Crops	70.99
Mature Horticulture Crops	374.29
<b>Total Area</b>	<b>445.88</b>

**Figure 4.4 Area under Different Categories of Horticulture Crops in Hisar-II Block**



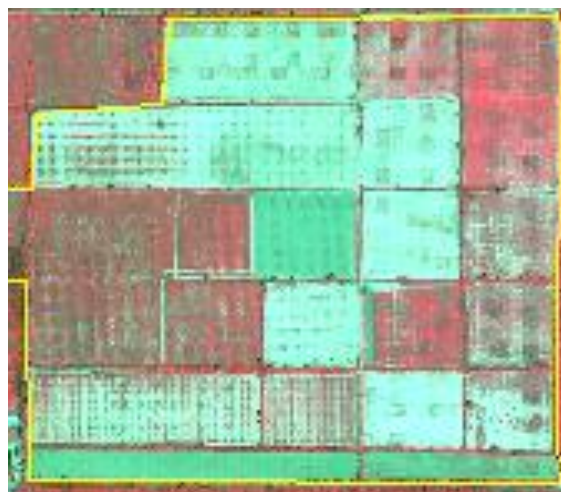
**Map 4.4: Horticulture Fruit Crops Map of Hisar-II Block**



**Figure 4.5 Identification of Mature Horticulture Fruit Crops on satellite data in study area**



**Figure 4.6 Identification of Young Horticulture Fruit Crops on satellite data in study area**



**Figure 4.7 Identification of Mature Horticulture Fruit Crops Through ground truth of study area**



**Figure 4.8 Identification of Young Horticulture Fruit Crops Through ground truth of study area**



## 5 CONCLUSIONS

Young and Mature Horticultural fruit crops mapping were done for Hisar-II, and Adampur blocks of Hisar district. Different types of available data such as World View-2, 8 band multispectral data having spatial resolution 2 meter was explored to assess the best dataset for such type of studies. Geo-referenced World View-2 multispectral data was mosaiced and study area blocks were extracted after overlying administrative boundaries. Digital data was displayed and horticulture fruit crops area was delineated. Different enhancements techniques were used to identify horticulture fruit crops. On screen visual approach was used for identification of fruit crops classes.

1. The total horticulture fruit crops area in the study blocks is 952.23ha. Concentration of Horticulture fruit crops area is more in Adampur block having 506.23 ha. Area is significantly higher as compared to Hisar-II 445.88 ha.
2. Total horticulture crops area is categorized in two categories i.e. Young and Mature/Old crops. Young horticulture crops recorded 310.07ha. While old crops area was slightly higher 642.04 ha.
3. Out of total area 67 % area is under mature horticulture crops and 33% under Young horticulture crops.

4. Citrus is the major crop of the study area followed by Guava, kinnow and anola. As the area of Guava, kinnow and anola is insignificant and spectral signatures are similar to Citrus hence cannot be separated.

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