

HASS CARMEN®

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A PRECOCIOUS FLOWERING AVOCADO TREE

Introduction



In approximately 1986, a distinct avocado tree was observed in the southern region of the Basilia valley in the municipality of Uruapan, Michoacan, Mexico

Morphologically similar to conventional Hass, but with an atypical and consistent precocious flowering pattern

The maturity of this fruit coincided with that of the off-bloom crop of conventional Hass, which in Mexico is referred to as the 'Loca' or "Crazy" Hass.

This crop matures 1 - 2 months earlier than traditional Hass





Carlos Mendez, a well known avocado grower in the region, became aware of the existence of this peculiar tree and continued to observe its behavior over time

This fruit eventually was referred to as the Mendez type

Unique characteristics

Precocious flowering habit

In Mexico, 40% or more of total crop matures 1-2 months prior to traditional Hass (in June – Sept)

Depending on early fruit set, produces an additional crop during traditional Hass season

Proportion varies from year to year





Hass Carmen fruit has post-harvest characteristics identical to Hass

Some alternation

Non apical dominance

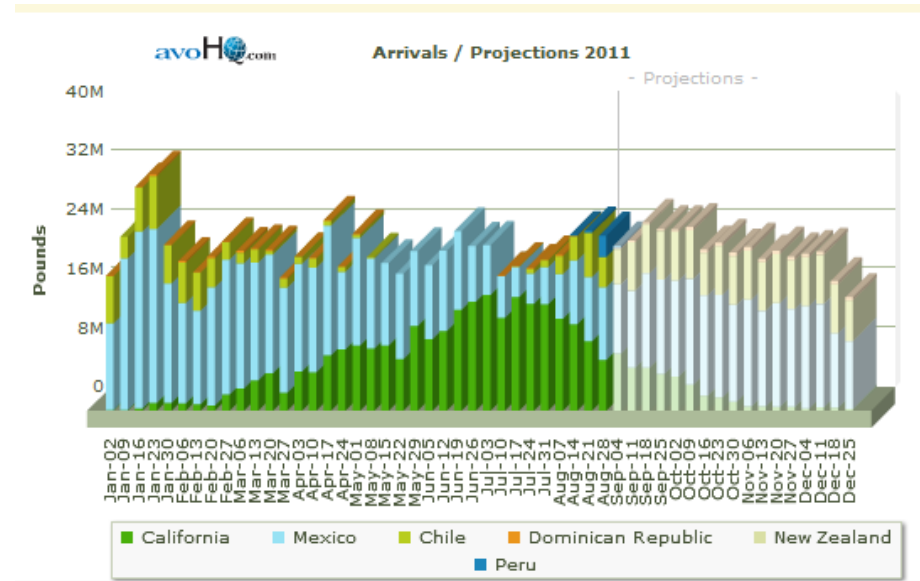
Multiple shoots



Development in Mexico

The initial commercial volumes were shipped to the most important domestic markets, principally Monterrey

The Mexican share of the US avocado market has increased significantly each year; exceeding 50% of the total in some years





Michoacán producers of Hass Carmen have benefitted from very high prices due to the strong demand in June – September
Significant volumes of Carmen have been exported to the US in the past several years

It is estimated that there are at least 5,000 to 6,000 hectares currently planted in Michoacan alone

Nurseries produced approximately 350,000 new plants this year

Production of 26.5 tons/ha has been recorded during the high volume years



Ongoing development in the rest of the world

Contact was made during 1996-97 with Hank Brokaw, of Brokaw Nursery in Saticoy, California

The name “Hass Carmen®” was selected and legal rights were secured under Docket no. BROKAW – 36564 in the USA



As of this date, legal protection has been secured and the Carmen is either in early commercial development or commercial trial in the major Hass avocado producing and exporting countries



South Africa

- Westfalia Technological Services imported budwood in January 2002, top worked trees for evaluation
- According to data by Therese Bruwer, performance similar to Mexico
- After several years of evaluation, a Carmen[®]-Hass grower club was established; currently subscribed to 100,000 trees with further expansion planned
- Carmen[®]-Hass is protected by Plant Breeders Rights (ZA 20083839)

Fruit

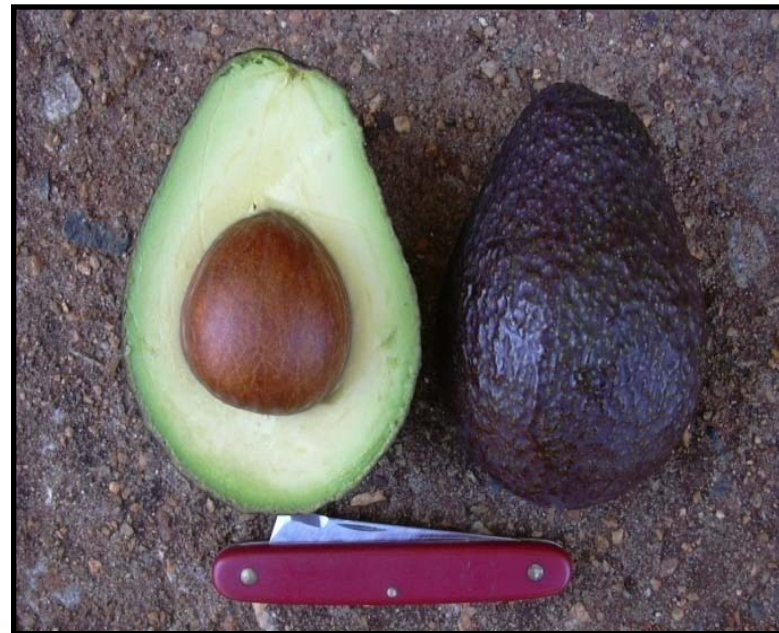
Carmen[®]-Hass

- Obovate
- Fairly large seed
- Medium skin thickness
- Hass look-alike



Hass

- Obovate
- Fairly large seed
- Medium skin thickness



Tree: Growth habit

Carmen[®]-Hass

Round, compact
dense canopy



Hass

Round, spreading
open canopy





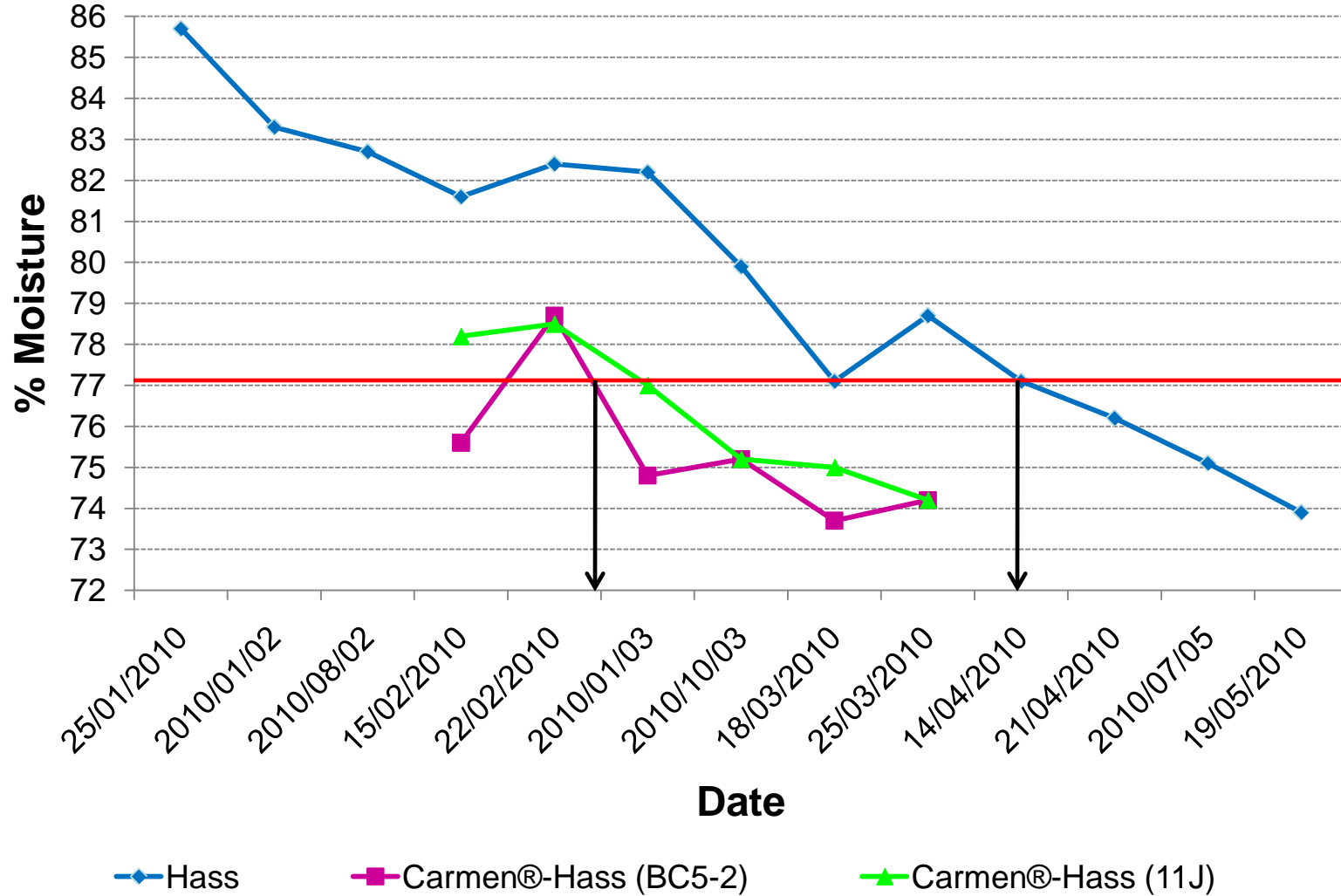
Out-of-season bearing

- Up to 40% of normal season crop
- Mature: November - December





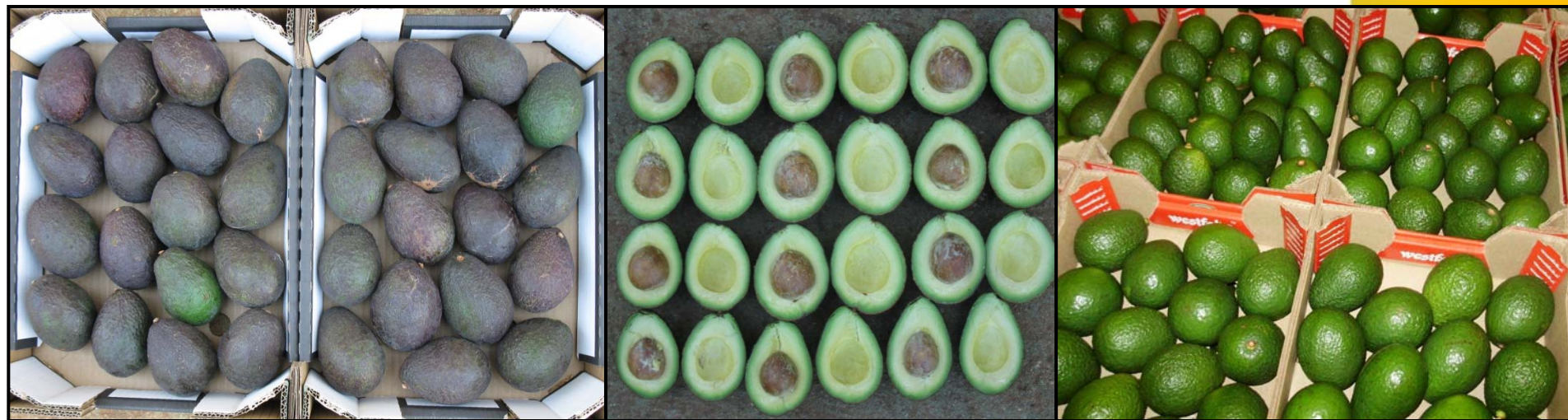
Season of maturity





Pre- & Post-harvest

- Carmen[®]-Hass = Hass fruit quality
 - Tolerate pre-harvest diseases
 - Tolerate an extended period of low temperature storage as required for export





Sensory quality evaluation

- Campden Laboratory: London(April 2008)
- Carmen[®]-Hass vs. Hass from Peru

Cultivar	External appearance	Internal appearance	Odour	Flavour	Texture/ mouthfeel	Average
Carmen [®] (South Africa)	7	7	7	7	7	7
Hass (Peru)	6	8	6	5	5	6

Quality grade for each attribute

1: Bad quality, 5: Satisfactory quality, 9: Excellent quality

California

Hass Carmen:

- Blooms very early, but low temperatures during winter minimize off-season production
- Bloom and set during traditional Hass flowering period similar to Hass
- Hass season fruit indistinguishable from conventional Hass



California

Date planted: August 2006

First commercial harvest: early 2010 at 3 1/2 years from planting (previous crop damaged by frost)

	2010	2011	Accum
Hass	23.06	2.99	26.05
Carmen	12.17	17.05	29.22

Study needed regarding fruit size during back to back heavy crops and response to girdling



Status in Other Countries

Australia: An initial field trial was planted in September 2010.

New Zealand : Field trials are underway

Brazil: Limited field trials only

Chile: Plant material has been introduced under test agreements and trees are being prepared for first trials.

Egypt: Material is present; initial trial planting to be established during 2011 or 2012.

Israel: Material is present and will be increased for field trials.



Morocco: Material is present and will be increased for field trials.

Peru: Material has been introduced for field trials to be established during 2011

Spain: Test plantings have been established but no data has been developed as of this date.

USA: Carmen is commercially available and testing continues in several locations.



Conclusions

Hass Carmen[®] is a precocious bearer, in some areas it will extend the season by 4 weeks or more

The Hass Carmen[®] has become a widely adopted and significant cultivar in the Mexican avocado industry, and is well established in South Africa

The fact that Hass Carmen[®] fruit is identical to Hass implies ready markets with no resistance to new cultivar

A close-up photograph of several green avocados hanging from a tree branch. The avocados are in various stages of ripeness, with some showing a more pronounced bumpy texture. The background is filled with green leaves and branches, creating a natural, outdoor setting. The word "GRACIAS!" is written in a bold, red, sans-serif font across the center of the image, underlined.

GRACIAS!