

# CHILLING HOURS REQUIREMENT IN THE EARLY CHERRY PRODUCTION

LUIS ESPINDOLA PLAZA - ALEJANDRO NAVARRO DIAZ. ENG. AGRONOMISTS U DE CHILE, MEMBERS OF POMANOVA.

Chile concentrated 94 % of its cherry sales in the Asian market in the 2020/21 season and for the second consecutive season the pandemic

The Covid-19 disaster greatly affected the mid-season and late-season market for cherries from the southern hemisphere, leading us as an industry to rethink what the future holds after Chinese consumers have had the experience of buying cherries at low prices, and we do not know if this will be temporary or not.

## CROP CONCENTRATION

Today we have a distribution of the Chilean cherry co-harvest with 80% of the fruit in the months of December.

The early varieties do not account for more than 20% of exports, and are mainly concentrated in the month of November.

As an industry, we have the opportunity to develop production in early areas for cherries, where we have the following advantages: A good market (very little supply of fruit), labor and packing process capacity, which is used in its installed capacity of no more than 20%.

Today we have exports of more than 352,000 tons and the early varieties account for no more than 25% of this volume, where the most planted is Santina (18% of the volume), followed by Royal Dawn (4%).

and others such as Brooks in lower percentages.

## EARLY PRODUCTION AREAS

The largest production of early variety fruit is concentrated on the coast of the Metropolitan, VI and VII regions, where in the latter region Sagrada Familia in Curicó is located. Today we have an expansion of the crop towards earlier areas and for this the industry is moving north, with commercial projects in the V and IV regions of the country, reaching as far as Ovalle with plantations of Brooks, Royal Dawn and Santina varieties, as well as new varieties that are beginning to develop in these new areas.

**Cold Requirements:** Cherry is a species that requires the accumulation of Cold Units, which are counted in different indicators such as Chilling hours (CH), Richardson Units and Cold Portions (CP), to mention the most commonly used. This accumulation of winter cold is required to break dormancy in order to vegetate and produce fruit in good condition during the season. In cherry this factor is one of the main factors to have commercial productions with adequate yields and as we move towards warmer areas this factor becomes more important.

This could be an important limitation, so it is necessary to know the requirements of cooling units of the different varieties, especially the new ones recently introduced in our country, in order to minimize risks in new developments in these areas.

**Cooling Units:** During the 2020/21 season, 4 new cherry varieties were evaluated in the Tricao area, located 15 km from Curicó towards the coast. To determine the winter chilling requirements of the varieties under study, the following methodology was developed:

Twigs of the varieties to be evaluated were collected during the winter recess period every time a certain number of chilling units were reached, starting on May 1, 2020.

The material collected in the field was taken to a sprouting chamber with constant light at 21 °C for 8 weeks to measure sprouting. When the green tip phenological stage was reached in 50% of the buds, bud dormancy was considered to be exceeded, since this is a common measure to determine the cold requirement in different species (Figures 4 and 5).

Climate data were collected from a weather station located at the site from May to August 2020.

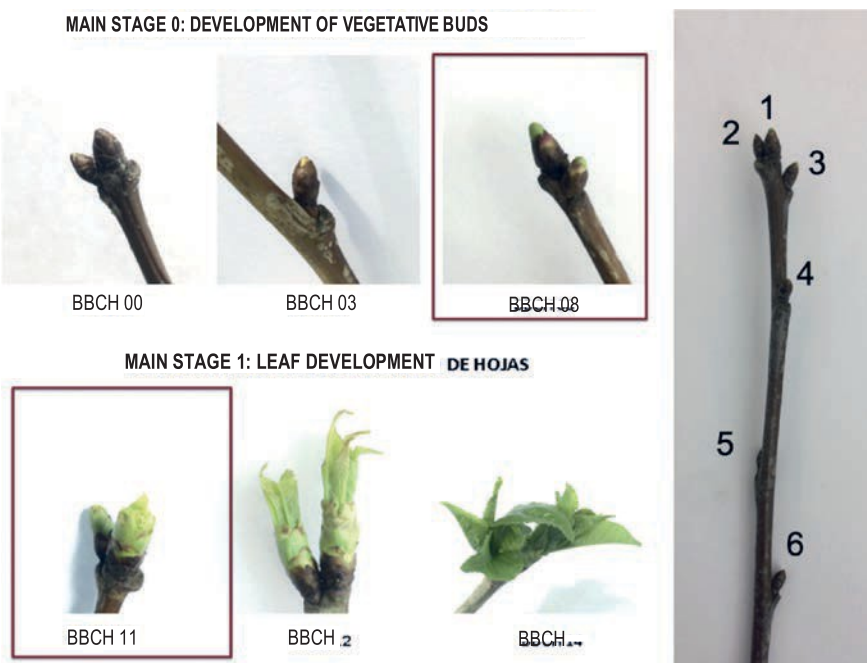


Figure 4. Phenological stages of cherry, stage 1 is considered as budded.



Figure 5. Variety IVU 115@ more than 50% sprouted with 500 HF and variety IVU 533@ a low %.

Figure 6. Accumulated Chilling hours since May 1, 2020. Tricao, VII region.

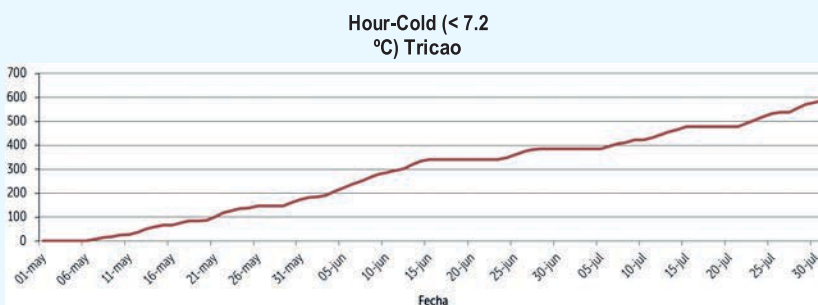
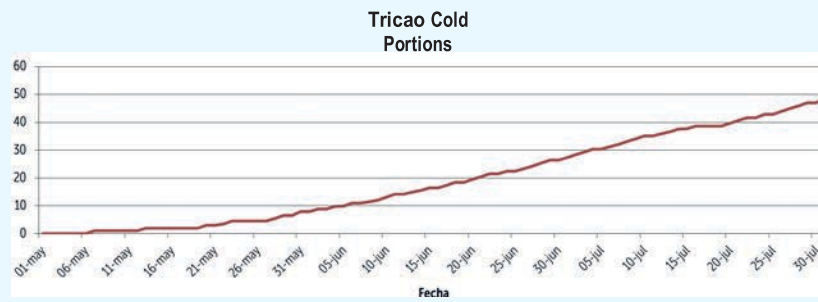


Figure 7. Accumulated Cold Portions since May 1, 2020. Tricao, VII region.



ROMPIMIENTO DORMANCIA (50% Brotación)				ROMPIMIENTO DORMANCIA (50% Brotación)			
CHILLING HOURS				COLD PORTIONS			
VARIEDAD	500	600	700	VARIEDAD	42	49	55
IVU 104®	X			IVU 104®	X		
IVU 105®			X	IVU 105®			X
IVU 115®	X			IVU 115®	X		
IVU 533®			X	IVU 533®			X
LAPINS	X			LAPINS	X		
SANTINA		X		SANTINA		X	
REGINA			X	REGINA			X

Figure 8. Chilling hours and portions of chilling required to break the winter break of 8 varieties of cherry trees in Curicó. Source: Author's data. 2020.

Winter cold accumulation (Chilling hours and Cold Portions) was calculated based on the Cold-Hour (Weinberger) and Dynamic Model (Erez and Couvillon).

**New Varieties:** New genetic programs exist in Chile and it is very important to know the cold requirements for an adequate winter break of these early varieties. In general, varieties from genetic programs originating from California have lower winter chilling requirements. The current programs are: IFG: International Fruit Genetics LLC, SDR Fruit LLC, SMS Un- limited LLC and Proprietary Fruit Varieties LLC (IVU). There are other early variety programs of European origin, which, in general, have higher winter chilling requirements: UNIBO (Italy), JKI (Germany), INRA (France) and Delbard (France).

cia). In order to correctly zone commercial plantings of these varieties, it is important to know the chilling requirements to achieve an adequate winter break.

### RESULTS

The winter chilling requirements for an adequate recess break were determined for the following varieties: IVU 115®, IVU 104®, IVU 105® and IVU 533®, all of them with a high winter chilling requirement.

from the Proprietary Fruit Varieties LLC (IVU) genetic program in California (USA).

The chilling requirements of each variety are expressed as Chilling Hours and Chilling Portions, which are shown in Figure 8. For reference, the values for three commercial varieties, with a large planted area in Chile, are also shown.

The IVU 115®, IVU 104® and IVU 104® varieties achieved

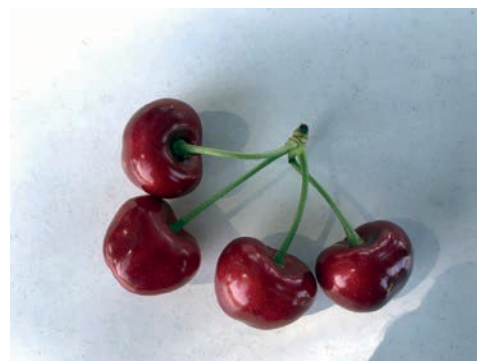


Figure 9. Early varieties IVU 115® (14 days before Santina) and IVU 104® (5 days before Santina).

broke their break with an accumulation of 500 Chilling hours and 42 Portions, similar to those of Lapins in the same trial.

Finally, the varieties with the highest winter chilling requirements were IVU 105®, IVU 533®, with a requirement of 700 hours of chilling and 55 portions of chilling, as measured for the Regina variety in the same location.

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**Meda** es un nuevo grupo de cerezas tempranas desarrolladas por Marvin Nies durante 50 años en California y luego de 10 años de selecciones rigurosas por International Variety Unlimited LLC (IVU), hoy llegan al mercado mundial para ocupar un espacio donde no es común tener Cerezas tempranas de gran calibre, firmes, dulces y de buena postcosecha.

### Meda Rex (IVU 115®)

Varietal temprana: 14 días antes de Santina

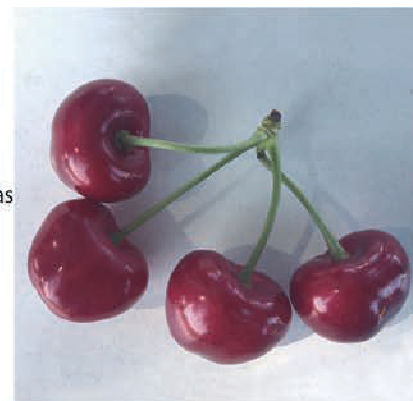
- Firmeza 88 Durofel
- 22 Brix de azúcar (rojo caoba)
- Postcosecha: Muy buena (35-40 días)
- Fruto: Calibre 28-30 mm
- Pedicelo: Muy firme, 3 cm de largo
- Producción: alta, producción en dardos
- Alelos: S1S4
- Época de Floración: Temprana
- Polinizante: Lapins
- Horas de Frio: 500 (42 Porciones de Frio)



### Meda Bull (IVU 104®)

Varietal temprana: 5 días antes de Santina

- Firmeza 90 Durofel
- 24 Brix de azúcar (rojo caoba)
- Postcosecha: Excelente (40-45 días)
- Fruto: Calibre 28-30 mm.
- Pedicelo: Muy firme, 3 cm de largo
- Producción: alta, produce en dardos y ramillas
- Alelos: S1S3
- Época de floración: Temprana
- Polinizante: Lapins
- Horas de Frio: 500 HF (42 Porciones de Frio)



Bull tiene muy baja tasa de respiración y se conserva extraordinariamente bien, no desarrolla pitting y es brillante después de 40 días de almacenaje.

Rex: dulce y crocante, la mejor variedad de cereza temprana

Bull: Excelente postcosecha, fresca, dulce y muy crocante

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