



1



Certified Sunflower (*Helianthus annuus*) Seed Production in Chile

Rebeca Unghiatti Rosales
Departamento de Ciencias Vegetales
Facultad de Agronomía e Ingeniería Forestal
Pontificia Universidad Católica de Chile
raunghia@uc.cl

2

Types of sunflower based on their end use:

- Oil seed
 - Characterized by black hulls
 - Crushed into oil
 - Smaller seeds and seeds that have been scuffed during transport and processing are used for bird food.
- Oil: 46 – 50%
Size: 4,5 – 8 mm



3

Types of sunflower based on their end use:

- Confectionary
 - Striped hulls
 - Confectionary kernels, roasted and salted or roasted and not salted, edible chips
- Size: 8 – 12 mm
Oil: 30 – 40%



Confectionary

Sunflower production in Chile:

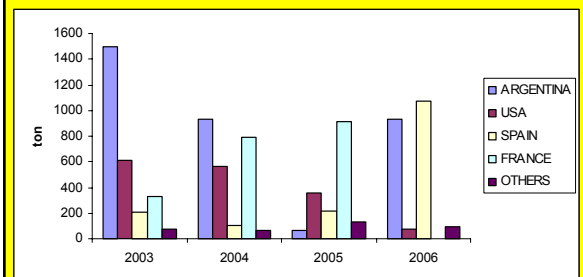
Comercial oil production: 1939-1994

100% of Chilean sunflower seed is exported with the majority going to Argentina, France, Spain and USA



5

Exports



6

Chilean seed reception

- SAG inspection (Servicio Agrícola y Ganadero)
- Necessary documentation:
 - Phytosanitary Certificate
 - ISTA Analysis Certificate
 - AOSA
 - Official Certificate of Analysis (origen)
- Weeds:
 - Orobanche spp.*
 - Cirsium arvensis*

13

Reception by the chilean company

- Analysis: Germination, physical purity
- Cold treatment



14

Female line

- Greenhouse trials: % male fertile female line

↓
Number of persons to hire

↓
Assures genetic purity



15

Seed Production

- Isolation: Parental lines 3000m
Hybrids 1500m
- GPS
- Crop rotation: Absence of off-types to ensure:
 - genetic purity
 - sclerotia



16

Planting pattern

Number of rows: female line CMS
multifloral male fertile pollinator

female	male
6	2
8	4
8	2

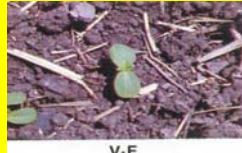


1. Split date

18

Nicking

2. Seeding depth:



V-E



V-2



V-4



True leaf - 4 cm

V-12

VEGETATIVE GROWTH STAGES
Schneider and Miller, 1981

Seeding rates

- Goal: Produce the maximum yield of high purity seed of saleable kernel size
- Oil seed: Small seed size
- Density: 60,000 plants ha⁻¹
- Higher leaf area
- Head size
- Adequate seed size
- Planting pattern: 2:8 (larger seed size)

Seeding rates

Confectionary: Larger seed size

- Density: 70,000 plants ha⁻¹



Certification request to SAG:

- Before 30 days after planting

SAG Information request

1. Final: commercial container
2. Not final: Container 600-900 Kg

TIPO DE CERTIFICACIÓN: EXPORTAC	SETEMA DE CERTIFICACIÓN: ARG	MODALIDAD: NO DEF
ESPECIE: MA / Zea mays L.	VARIEDAD: ARG 100 AG	PAIS DESTINO: ARGENTIN
Species	Hybrid	Country
ANTECEDENTES GENERALES		
PRODUCTOR: TASCHE SEMILLAS LIMITADA		
MULTIPLICADOR: ANTONIO FERNANDEZ		
PREMIO (nombre, ubicación, tamaño acres, distancia)		
MONTA AL BORE PUANDE EN EL KM 45 DE LA AUTOPISTA DEL NOR HACIA SAN ANTONIO. TOMAR LA SALIDA PUANDE CONTINUEN AL FINAL DE LA PISTA DE DESACELERACION DORMIR EN Y HACIA LA DERECHA Y TOMAR EL CAMBIO DE TIERRA HACIA EL NORTE. PASAR POR LA PASTE DE SECAO DE GRANOS Y SEGUIR HASTA LLEGAR AL KM 481 A LA ENTRADA DEL FONDO. TOMAR INMEDIATAMENTE EL CAMBIO A LA IZQUIERDA Y SEGUIRLO HASTA LLEGAR A UN POCERO TRANQUO. SEGUIR POR EL CAMBIO DE LA DERECHA A ORILLAS DEL UN POTRERO CON CARROBOS Y LLEGAR AL POTRERO CON MARISELLA.		
REGION: 13	State	COMUNA: 366666
COORDENADAS GPS	GPS	LONGITUD: -7112530
		LOCALIDAD: MONTE ALEGRE
		LATITUD: 3338660

Seed production

- Cut flowers before R3, genetic purity
- R6 ligulate flowers dry out
- Male cut
- Last irrigation
- Ligulate flowers fall off
- Last roguing



Seed production

- Sclerotia
- Spiny cocklebur, hooked prickles (*Xanthium spinosum*)
- Field bindweed, capsule (*Convolvulus arvensis*)



HARVEST



- 100% R9 harvest
- Moisture content 12%
- Avoid cracking the seed

33

Harvest



Facility processing reception

- Sample: Moisture content, physical purity
- Weeds
- Sclerotia



Pre-cleaning



Leaves
Head pieces
Dust
Stems



Drying



- Drier, cold air x 2 hours
- Increase temperature no greater than 34°C
- Moisture content to 8 - 10%

Air-screen cleaners

4.5 mm – 8.0 mm




Density Separator

39

Packaging Final control sample



40



Seal and label



42

