



INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ



**Inovace studijních programů AF a ZF MENDELU  
směřující k vytvoření mezioborové integrace  
CZ.1.07/2.2.00/28.0302**

**Tato prezentace je spolufinancovaná z Evropského sociálního fondu a  
státního rozpočtu České republiky**

# **THE ASSORTMENT OF COLE CROPS**

## The Characteristics of Cole Crops

- The family of Brassicaceae
- Cole crops form an outer and an inner cabbage-stalk
- They root to a depth of 0.25-0.3 m (up to 1 m)

Harvesting          Spacing

Early cole crops: May, June          40×40 cm

Summer cole crops:          June–September 50×50 cm

Late cole crops          September–November

Nutritional value          60×50 cm

- A high content of vitamin C (400-1,800 mg.kg<sup>-1</sup>)
- A high content of fibre and minerals

Dates in the Cultivation of Cole Crops  
Sowing Planting of seedlings

Harvesting

Early varieties: 1–20 February By 10  
April

Sowing to  
pre-cultivate seedlings End of May and  
June

as well as direct sowing Planting

Harvesting

Summer varieties: 1–20 April Middle  
of May July–September

Late varieties: 15–25 April 15–30  
June

An exception October (–November)

Late 1–10 June 15–30 July

October–December

broccoli

## HEAD CABBAGE

*Brassica oleracea* L. convar. *capitata* var. *capitata* L.

Early cabbage

- The content of dry matter and coarse fibre,  the saccharide content
- Small heads of 0.5-1 kg, high water content, succulent
- The cabbage is not storable and wilts fast
- Tastier, easy to digest
- Small areas – the sales are low
- If heads are not packed properly, it is OK

## Processing cabbage

- □ The content of dry matter □ the saccharide content (red cabbage is not used for processing as it gets dark)
- Big heads of 3-5 kg (the Pour cabbage cultivar can even reach 10 kg)
- Thin cell walls, large vacuoles
- A rather high saccharide content in the sap – good fermentation
- Rather poor durability, bruising when harvested mechanically
- Need to process by Christmas time
- Highest yields of 100-130 t/ha



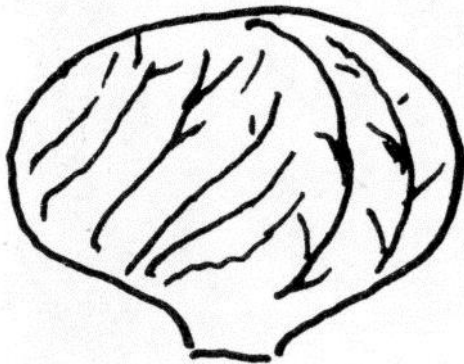
## Storage cabbage

- □ The content of dry matter and coarse fibre (also red cabbage)
  - Rather small heads of 2-3 kg
  - Yields of 50 t/ha
  - Thick cell walls, small vacuoles with a low saccharide content – not suitable for fermentation
- The advantage of smooth mechanical harvesting
- Possible long storage, even until May, in cold stores until the harvest of early cabbage
- A group with good prospects – produce less sauerkraut and use non-preserved stored cabbage for mixed salads (The cabbage is blanched with hot water)
- Necessary to have well-packed heads

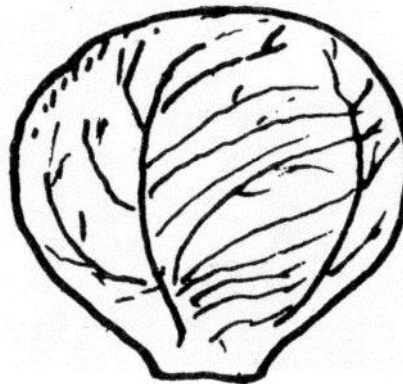


# Head Types - Shape

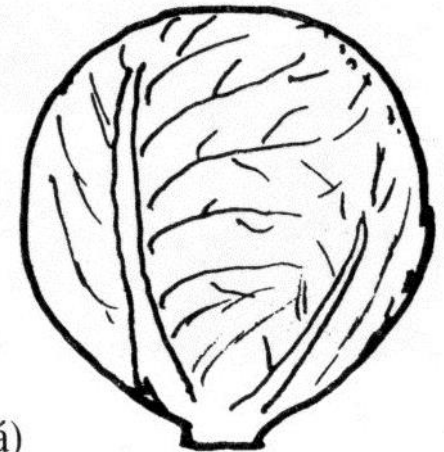
plochá



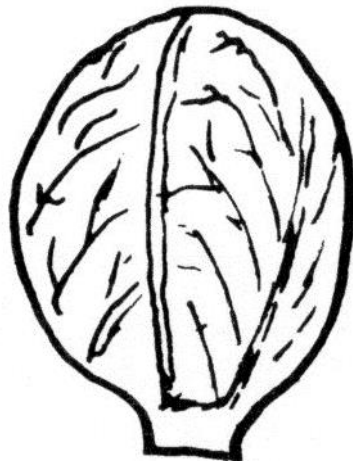
ploše kulovitá



kulovitá



vejcovitá



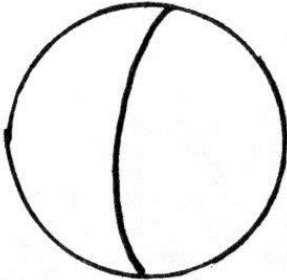
zašpičatělá (špičatá)



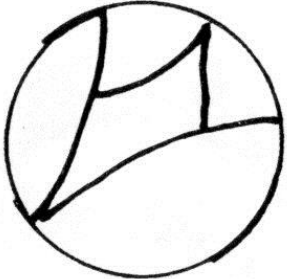


# Head Types – Compactness

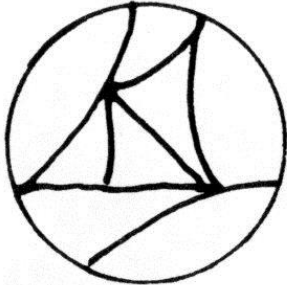
dobře uzavřená



středně dobře uzavřená



špatně uzavřená



## Outer Stalk

Short 20-40%

Medium 40-60% of the height of the head

Tall 60-80%

- The shorter the outer stalk, the worse results of mechanical harvesting – the bottom parts of heads get damaged
- Tall outer stalks cause heads to uproot
- Ideally medium tall stalks that do not uproot and are well embedded in the ground; when harvested mechanically, cabbage is not damaged



## Inner Stalk

Short Up to one third of the height of the head

Medium Up to a half

Tall Over a half

- The following rule used to hold:

The taller the inner stalk, the firmer the head; nowadays, new cultivars form firm heads even though the inner stalk is short

- A demand for cultivars with short inner stalks
- At processing, tall inner stalks are drilled off if they weigh more than one third of the weight of the head – big losses
- Modern varieties with a short inner stalk produce very good yields – the stalk only amounts to no more than 10% of the weight of the head



## Early Cultivars

- A short outer stalk
- Harvesting in May and June, a growing period of 60-90 days from planting
- Foreign cultivars are more expensive (2-5 times), yields are equal
  - □ 1 kg of Czech seed costs 2,000 CZK / F1 seed costs 5,000 CZK □ □ 1 kg of foreign seed for 10,000 CZK or more!
- Heterotic – a higher degree of uniformity
  - Early cultivars are usually harvested manually
  - These cultivars are usually not grown on a large area, mechanisation does not pay off
  - Older cultivars are harvested 2-3 times by thinning – mechanical harvesting is not feasible
  - New hybrid F1 cultivars can be harvested mechanically – on a larger stretch of land)

## HORNET F1

- A very early cultivar, 57-62 days from planting
- For direct consumption
- To be grown covered with plastic sheets and for an earliest field growing
- Rather small, round, well-packed heads of 0.8-1 kg
- Medium green leaves
- Medium resistance to splitting





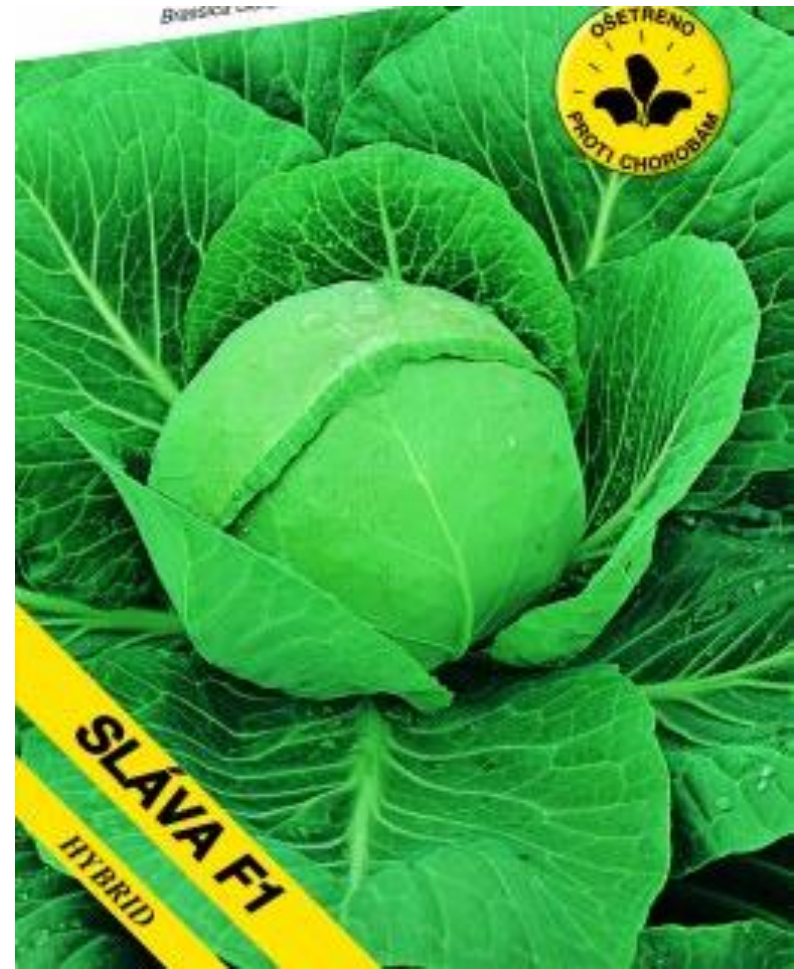
## DYNAMIC F1

- A very early cultivar, 60-65 days from planting
- For direct consumption
- Heads of 0.8-1.1 kg, medium-sized, wide-oval, firm, and very well packed
- Dark-green wrapper leaves



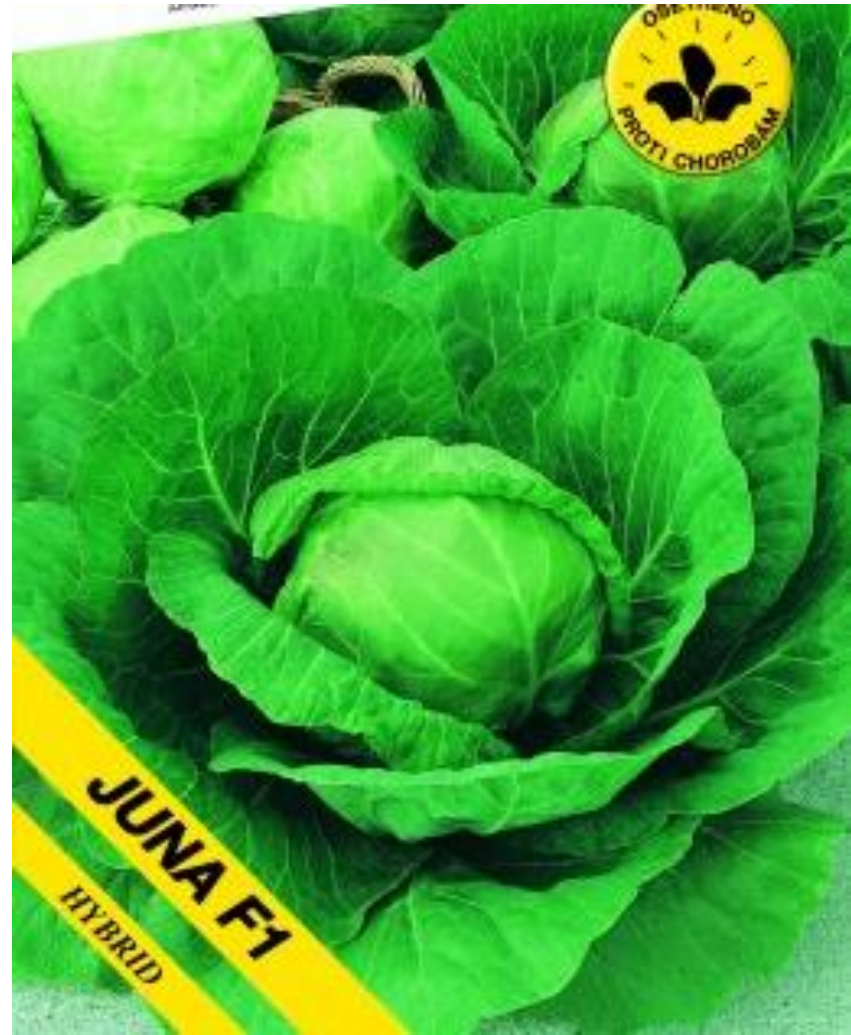
## SLÁVA F1

- An early cultivar, 70 days from planting
- To be grown during the whole year
- A weight of heads of 0.9-1.2 kg
- Resistant to low temperatures, splitting, and bolting



## JUNA F1

- An early cultivar, 70 days from planting
- Heads of 0.6-0.7 kg, ovoid, well packed
- Resistant to splitting





## UNIKÁT F1

- An early cabbage, 80 days from planting
- For direct consumption and processing
- Round heads of 0.9-1.5 kg, firm
- Very uniform as to the shape and earliness
- Fine inner texture
- Short stalks
- Heads are highly resistant to splitting – they do not overmature



## KORINO F1

- A medium early cabbage, 90 days from planting
- For direct consumption and early processing
- Resistant to overmaturing and head splitting, the cabbage can stand 4 weeks in the field
- The cultivar is distinguished by a fine texture and a mild flavour of shredded cabbage



## RUFUS F1

- A medium early red cultivar, 95-105 days
- Universal in its use: direct consumption, processing as well as storage until the end of February
- Heads of intense colours, weighing 1.3-2 kg, firmly packed, with a medium inner cabbage-stalk
- Heads of this cultivar do not split
- Favourable yields and easy sorting of heads



## Summer Cultivars

- No local demand (for customers from abroad)
- The head of over 1 kg (1.2-1.5 kg)
- Medium early, medium late, a growing period from sowing of 130-180 days
- Difficult to store





## ZEUS F1

- A summer medium early cultivar, 75-80 days from planting
- For direct consumption, bigger well-developed heads also for processing
- Medium-sized heads of 1.7-2.2 kg, well packed
- Summer harvesting at the end of July and in August



## TORPEDO F1

- A summer late cultivar, 90-95 days from planting
- For direct consumption, a short storage for up to 30 days
- Heads of 2-2.5 kg, round, well packed, with a short medium stalk
- Harvesting in August and September, June sowing for harvesting in October and November
- Resistant to club root (*Plasmodiophora brassicae*)



ANETO – Medium-sized, round, a smaller amount of NO<sub>3</sub>

HIGUSTA F1 – Dutch, incredibly uniform

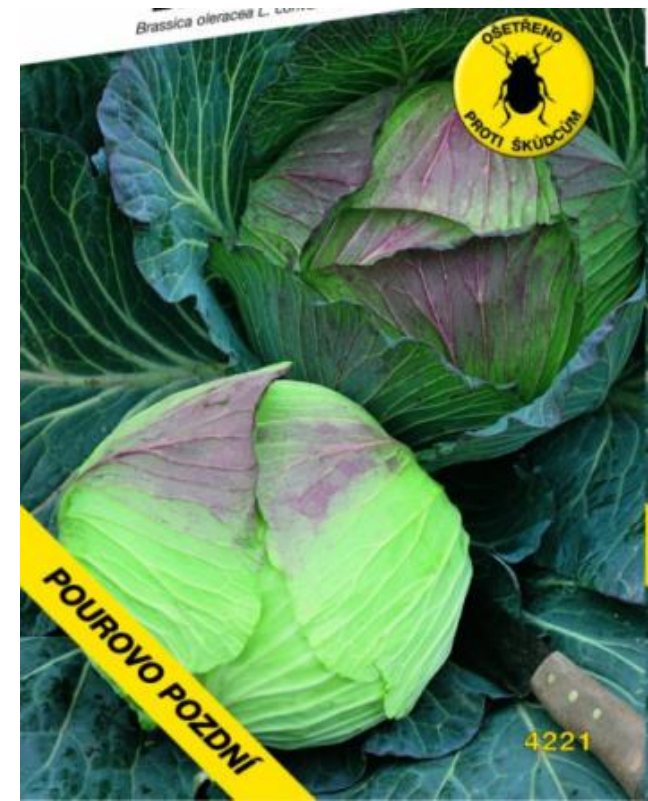
INTER F1 – Medium-sized, flat-round, also direct sowing

LENA F1 – Medium-sized, round, also direct sowing, a high yield

MARS – An old cultivar – cheap seeds, medium-sized, round,

## Processing Cabbage Cultivars (Medium Late and Late)

- Big heads, 3-10 kg
- High yields
- Limited storability (until Christmas time)





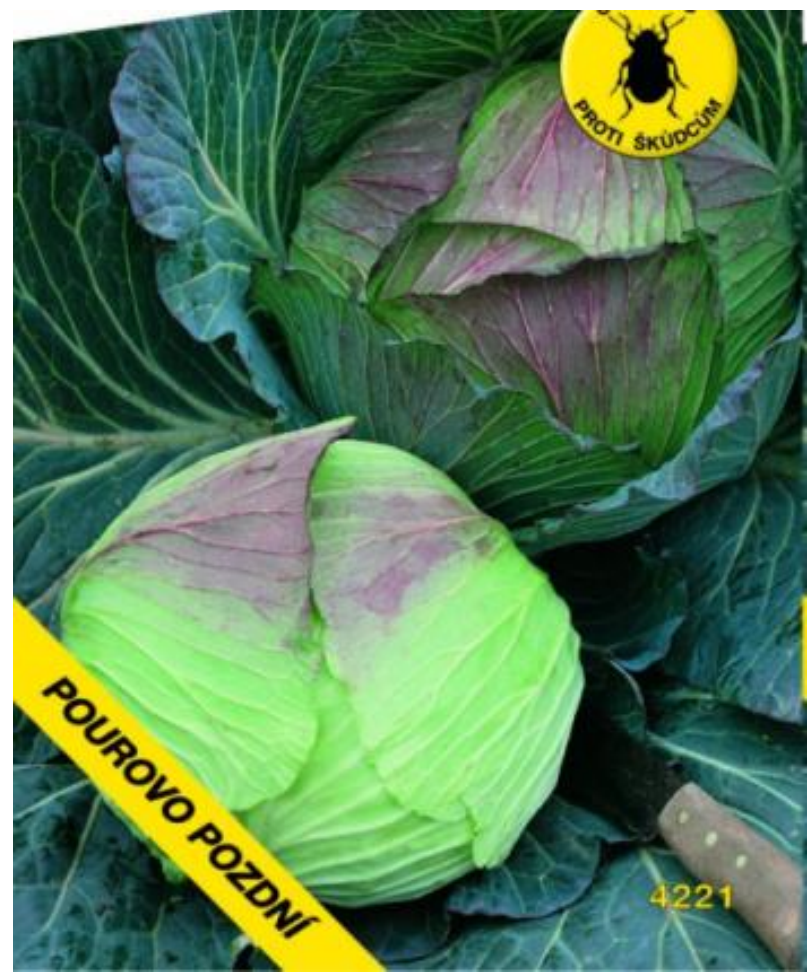
## THE POUR MEDIUM LATE CABBAGE

- An old Czech medium late to late cultivar, 110-120 days from planting
- Earlier called Dobrovodské polopozdní ("the Dobrá Voda medium late cabbage")
  - The plant breeding station in Dobrá voda, plant breeder: Mr Pour
  - For processing
  - Big heads of 4-8 kg, flat-round, well packed, pale green
  - A short outer stalk – the cabbage does not uproot
- Top class in terms of yield, but a rather high variability
  - The Pour medium late cabbage is grown most frequently:
    - A higher certainty
- The growing period is 30 days shorter than that of the Pour late cabbage □ The head matures perfectly



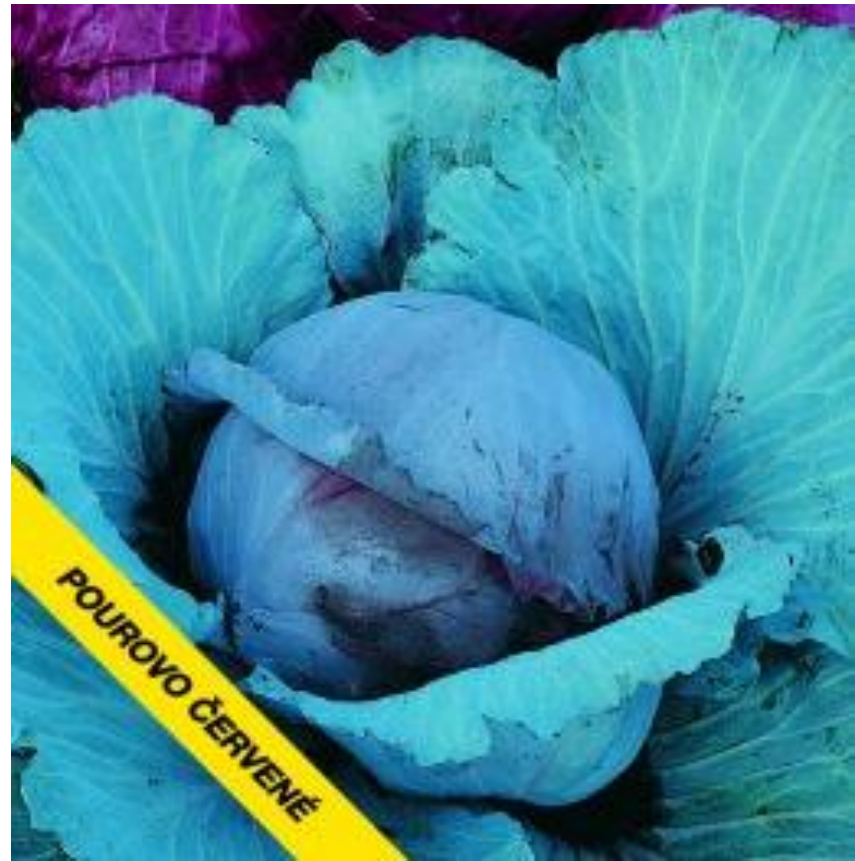
## THE POUR LATE CABBAGE

- An old Czech late cultivar, 150 days from planting
- Plus another 35 days in comparison with the Pour medium late cabbage
- Big, flat-round heads of 5-10 kg
- A reddish crown of the head
- No difference in yields between this cultivar and the Pour medium late cabbage



## THE POUR RED CABBAGE

- An old Czech late red cultivar, 170-190 days from planting
- The highest-yielding red cultivar in Europe
- Big, flat-round heads of 3-4 kg, red-purple inside when cut open, firm, well packed, a rather tall inner stalk
- Resistant to splitting
- Pickled cabbage
- Direct sowing



## MIDOR F1

- A hybrid, medium late cabbage cultivar, 110-115 days
- For processing, also suitable for direct consumption and a short storage
- Medium-sized to big heads of 4.2-5 kg
- A short inner stalk
- A perfect inner texture, a whitish inside
- A rather high sugar content
- When fermenting, the cabbage does not change colour
- High quality, no splitting



## AVAK F1

- A hybrid, medium late cabbage cultivar, 115-120 days
- For processing, also for direct consumption and a short storage
- Medium-sized to big heads of 3.8-4.5 kg
- A short to medium outer stalk, a medium inner cabbage-stalk
- High quality, this cabbage does not split or uproot
- High yields
- Uniformity of heads





## MADISON F1

- A hybrid, medium late cultivar, 115-120 days
- For processing, also for direct consumption and a short storage
- Round, big heads of 4.5-5 kg, well wrapped, with even inner density, a medium long inner stalk, and a medium outer stalk
- High-yield
- Spacing of 60 x 60 cm



## SONJA F1

- A hybrid, medium late cabbage cultivar, 115-120 days
  - Universal use: for processing, a short storage, and direct consumption
  - Big heads of 4.1-4.8 kg, flat-round, medium green to grey-green, having a medium outer stalk
  - Resistance to head splitting
  - High yields
  - Easy to sort
- For one-off harvesting



## PAVLO F1

- A hybrid medium late cabbage cultivar, 125 days from planting
- Processing
- A robust structure
- Round heads of 4.5 kg with a short inner stalk
- Resistant to overmaturing and head splitting
- Also possible to store





## RITMO

- A medium late cabbage, 125 days from planting
- Processing
- A robust structure
- Dark green heads
- Big, flat-round heads of 3-4 kg
- Resistant to uprooting and head splitting
- Fine inner texture
- Tolerance to a short storage



## TARGET F1

- A hybrid medium late cultivar, 125-130 days
- For processing and storage
- Firm heads of 3.3 kg, round, well filled and well packed
- A short to medium inner stalk, a medium to rather tall outer stalk
- Resistant to Fusarium
- A spacing of 60 x 60cm



## PORTO F1

- A late cabbage, 130 days from planting
- A cultivar of a universal use: for processing and a long storage
- Ovoid, hard heads of 4-5 kg
- A short inner stalk, a taller outer stalk
- Resistant to rotting, no splitting
- The cabbage can take a long time on the field and tolerates light frosts



## POLAR

- A late cabbage cultivar, 140-150 days
- Universal: for direct consumption, processing, and storage:
- The cabbage can be stored until March
- A cross between a processing and a storage cabbage cultivar  
(It can ferment like processing cabbage, too)
- Flat-round heads of 3-4 kg, well packed and firm
- Good yields
- No splitting
- For leisure gardeners and smaller growers
- Cheap seed





## KALIBOS

- A medium late red cultivar, 105-115 days
- For processing, direct consumption and a short storage
- Heads of 2-2.5 kg, markedly pointed, well packed
- Distinguished by its crisp inner texture, high sugar levels, and its taste
- No splitting



## Late Storage Cabbage Cultivars

- Smaller heads of 10-20 cm
- A weight of 1.5-3 kg
- A growing period of 130-200 days from planting
- Storage until April to May

## LIBRETO F1

- A hybrid late cultivar for storage, 130-140 days
- Heads of a round to ovoid shape, weighing 2.7-3 kg, very well packed, dense, with a very short inner cabbage-stalk
- A short outer stalk – resistant to uprooting
- Resistant to splitting
- Excellent storability
- Very easy to clean before dispatch
- A spacing of 50 x 60 cm



## AROS F1

- A hybrid cultivar for storage, 135-145 days
- Round, medium-sized heads of 2.4-3 kg
- High density of the head, high yields, and excellent sorting
- Although on a higher outer stalk, the cabbage does not uproot
- Even if left longer on the field, heads do not split
- A spacing of 50 x 50 cm to 60 x 50 cm





## TRVALO F1

- A late cultivar for storage, 145 days from planting
- A rather tall outer stalk
- Ovoid, very firm heads of 2.5-3 kg
- Storable for a long period



## ATILA F1

- A hybrid late cabbage cultivar for storage, 140-150 days
- Round, medium-sized, and very dense heads of 2.7-3.3 kg
- Highly resistant to splitting
- A spacing of 50 x 50 cm to 60 x 50 cm



## ALBATROS F1

- A hybrid late cabbage cultivar for storage, 140-150 days
- Round, medium-sized, very firm, evenly filled, and very well packed heads of 2.2-2.8 kg
- High resistance to head splitting
- A spacing of 50 x 50 cm



## HOLT

- A late cultivar for storage, 145-150 days
- Slightly flattened, medium to rather small heads of 2-3 kg
- Fully packed, very dense, and firm
- Heads do not split and nicely resist frost before the harvest
- No need of regular irrigation when the cabbage is grown from direct sowing
- Cheap seed



## MARATON F1

- A very late cultivar for storage,  
170 days
- No splitting
- Excellent storability
- Heavier soils

## MOHYKAN F1

- A hybrid red cultivar, 115-125 days
- For a long storage and direct consumption
- Dark purple, rather small, considerably firm heads of 1.9-2.4 kg with a short inner stalk
- Highly resistant to head splitting





## PEDRO

- Foreign, red
- Late, for storage, 155 days
- Rather small heads of 1.6-2 kg

## SAVOY CABBAGE

*Brassica oleracea* L. convar. capitata var. capitata L.

### Requirements

- Beet and potato production areas
  - Savoy cabbage tolerates worse soil and climate conditions than cabbage
- The lighter the colour of savoy cabbage, (pale green, yellow), the more in demand the savoy cabbage is

## Cultivars for Forcing in Polyhouses

### RAKETA

- Very early, 68-73 days from planting in a polyhouse
- For forcing in unheated plastic-sheet shelters
- Rather small, green heads, when cut open, the heads show a pale yellow colour
- Small, short plants on a very short outer stalk
- Sufficiently hardy seedlings are planted in March



## Early Cultivars

### EARLY YELLOW SAVOY CABBAGE

- Very early, 70-75 days from planting
- For the earliest field growing from transplants
- Small, short plants on a rather thin outer stalk
- Small, well packed, medium firm, pale green heads, they show a wonderful light yellow colour when cut open, very tasty
- High resistance to bolting
- Planting from the end of March to the middle of April
- Undesirable quality – very susceptible to infestation by aphids – the savoy cabbage has a pleasant sweet taste – Before harvesting, check on a daily basis!



## ENTIRA F1

- Very early, 75-80 days from planting
- For early field growing
- Short plants
- Small, well packed, medium firm heads, dark green leaves, the heads show a light yellow colour when cut open
- Resistant to bolting and head splitting
- A spacing of 40 x 40 cm
- To speed up the harvest, it is convenient to cover the plants with non-woven fabric



## Summer Cultivars (For Summer Harvesting)

– Not grown in the Czech Republic, no demand

### PŘEDZVĚST

- 85 to 90 days from planting
  - This cultivar matures a month earlier than the EARLY YELLOW SAVOY CABBAGE
  - For field growing from pre-cultivated seedlings from the mid-April to mid-May as well as from direct sowing (cheaper)
  - Medium-sized plants, a short outer stalk
- Rather small, ovoid heads of 1-1.5 kg  
Pale yellow when cut open
- Resistant to splitting and bolting
  - A spacing of 50 x 40 cm
  - Not storable





## CIDLINA F1

- 90-100 days from planting
- Rather small heads of 1-1.5 kg
- Direct sowing from mid-April to the beginning of August

## Late Cultivars for Storage

### VERITA F1

- Created from the VERTUS cultivar
- A hybrid, medium late cultivar, 95-100 days from planting
- For summer and autumn harvesting
- Big, round, well packed heads of 2-2.5 kg, showing a yellowish colour when cut open
- A medium inner stalk
- Resistant to uprooting and untimely splitting
- Storable for a short period of time (2 months)



## BLISTRA F1

- Late, 105-110 days from planting
- For summer and autumn harvesting
- Uniform – specifically for a one-off harvest
- Heads of a medium size and 1.5-2 kg, round, well packed, dark green, yellowish when cut open, with a short inner stalk
- Considerably crinkly outer leaves
- Resistant to splitting and uprooting
- Possible to store until January
- A spacing of 60 x 50 cm



## VERTUS 2

- 130-150 days from sowing to harvesting
- For direct consumption or freezing; storable until the end of March
- Flat-round heads of 1.2 kg, firm, dark green with very heavy bluish pruinosity
- When cut open, the cultivar is white to yellow, medium dense, delicious, with an inner stalk in size of two thirds of the head
- Tolerant of damage by aphids even at their repeated invasions in May and June



## LANGENDIJSKÁ

- Late, 135 to 145 days from planting
- Firm, small heads of 1 kg
- Very tasty, fine nervation, very easy to digest, very sweet, white-yellow
- Lower yields, though (usually heads of 2-3 kg)
- Resistant to splitting
- Tolerant to autumn frost
- Excellent to store until June (!)



## VERTUS

- A Czech medium late cultivar, 150 days from planting
- Flat-round heads of 3-4 kg, firm, dark green with very heavy bluish pruinosity
- High-yielding
- Rather coarse, distinct fibre (which is not desirable)
- This cultivar used to be grown in the past due to its yield and negatively influenced consumers' thinking of savoy cabbage – it scratches when going down the throat
- Tolerant of damage by aphids even at their repeated invasions in May and June
- Good to store until March



## JIZERA F1

- A Czech cultivar that has replaced VERTUS – it has a better taste
- Medium-sized heads of 2-2.5 kg
- Big, dark green, packed
- Storage until March

## ORLICE F1

- A Czech cultivar with medium-sized heads
- Storage until March

## VEGA F1

- A Czech cultivar, 3 kg in weight
- Yellow inside, heads do not split
- Heavily crinkly leaves

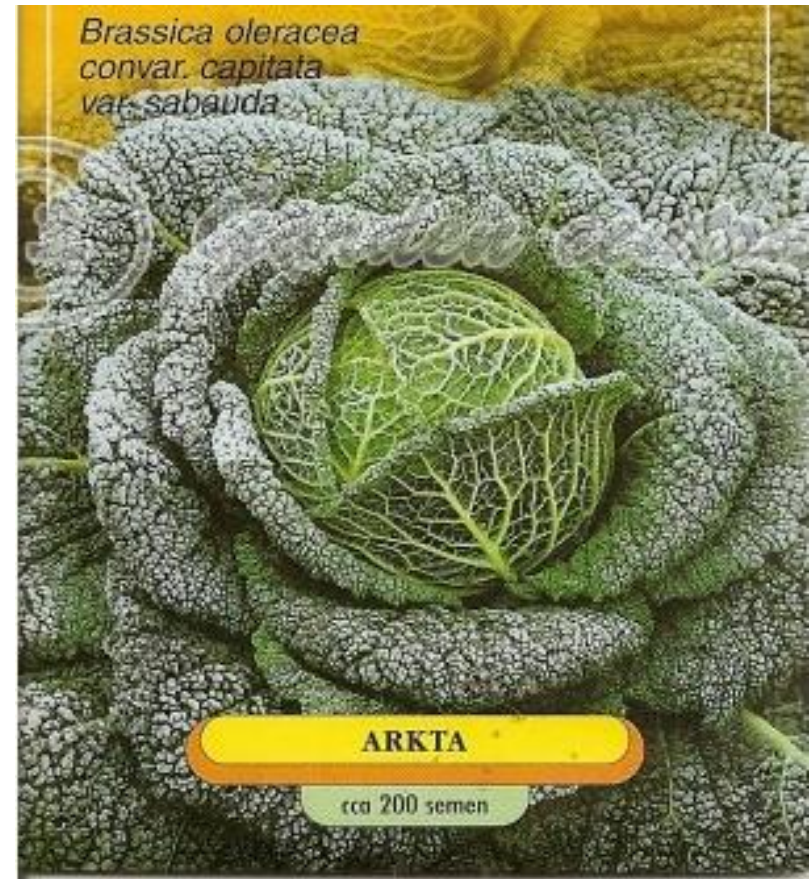
## WIROSA F1

- A late cultivar for autumn and winter harvesting, 137 days
- Flat-round, grey-green, slightly crinkly, and firm heads
- Highly frost-resistant up to  $-15^{\circ}\text{C}$ , wintering
- Harvest directly from the field from November to the end of February – Even looks better
- Do not store: high costs (!)
- Storage for up to 10 weeks
- This cultivar needs to form a firm head by the mid-October, otherwise it freezes even at lower temperatures
- A spacing of 60 x 50 cm
- A grower from a town near České Budějovice cultivates 5 ha of this cultivar, but there is a risk of freezing at  $-20^{\circ}\text{C}$



## ARKTA

- A Czech cultivar grown in Slovakia and Poland – exported to Germany
- Direct sowing or planting in nursery beds on 20 August
- Transplanted on 20 to 30 September
- The savoy cabbage winters at the stage of 4-5 leaves
- Harvested as an early 300g head at the end of May
- No cost for forcing (heating)
- Deer – need to cover with non-woven fabric
- Dark green
- Not popular in the Czech Republic



## TUNDRA

- Similar to Wirosa F1 – standard
- The cultivar winters nicely
- Grown to a lesser extent

## TARVOY

# CAULIFLOWER

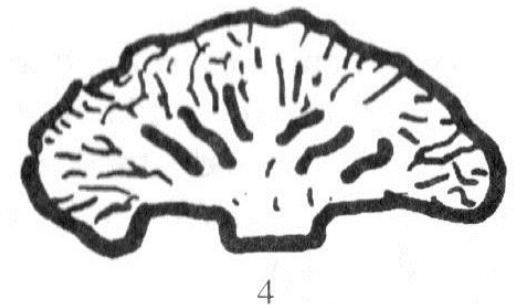
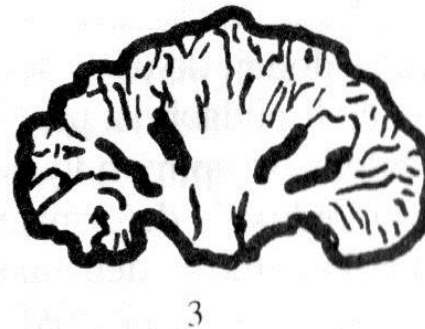
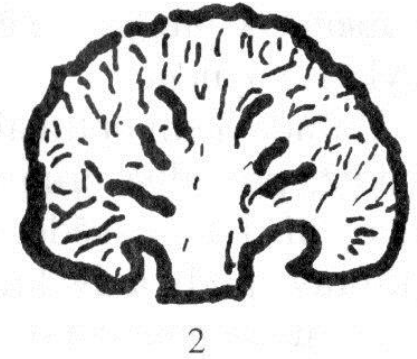
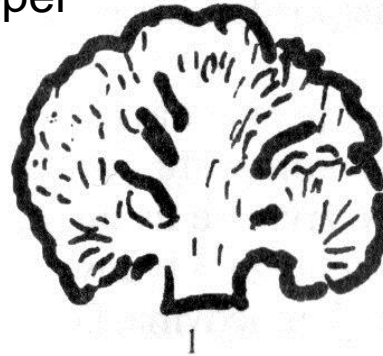
*Brassica oleracea* L. convar. capitata var. capitata L.

Curd Shapes

a) High dome shaped

Heavier, firmer, wrapped with leaves in a more elaborate way, in greater demand

b) Flat, poorly covered with the wrapper leaves





Grow cultivars with curds well covered with wrapper leaves, and resistant to yellowing and browning of curds

- Sunshine: with early cauliflowers, small leaf surface – crack, leaves are chipped
- Cauliflower curds of prime quality has to have a uniform colour, either yellow or white on the entire surface
- For a vegetable to be appealing in terms of profit, 60% of the harvest needs to be of prime quality





## EARLY CAULIFLOWER

Czech cultivars – good – more profitable –  
lower seed prices

### BETA

- Very early, 58-63 days from planting to harvesting
- For unheated forcing and the earliest field growing
- White, medium rough, and firm curds
- Highly resistant to purpling, riceyness, and yellowing
- This cauliflower requires highly intensive cultivation techniques
- A spacing of 40 x 40 cm



## BORA

- A very early cultivar, 60-65 days from planting to harvesting
- For the earliest field growing
- Plants of a weaker structure with a short stalk
- Firm, white curds
- Resistant to purpling
- Poorly wrapped – chip off the leaves
- Intensive cultivation techniques
- A spacing of 40 x 40 cm



## GAMETA

- An early cultivar, 68-74 days
- For spring and autumn harvest
- Medium-sized, highly domed, partially wrapped, medium rough, and finely granular curds
- Highly resistant to purpling, leaves growing in the curd, and yellowing
- Spacing of 50x40 cm



## Foreign Cultivars

### GOODMAN

- An early cultivar, 80 days from planting
- Very heavy curds of excellent quality and a snow-white colour
- Highly uniform curds, high yields
- Resistant to bad climate conditions
- Entirely lacking anthocyanin – resistant to purpling
- Strong, upright, dark green leaves perfectly cover the curd

## ARFAK F1

- Well covered with leaves, productive, low levels of waste

## ASTERIX F1

- Well covered in leaves, universal

## ARKTUR

- Firm, resistant to yellowing
- Early, autumn growing and wintering

## SUMMER CAULIFLOWER

- There is insufficient humidity in the Czech Republic; nobody grows this cauliflower these days; even in higher locations, only non-standard quality (90%) is harvested

### Foreign Cultivars

#### MALIMBA F1

- Early, 65 days from planting
- Well covered with leaves, universal, productive
- Prone to purpling
- A spacing of 75 x 50 cm, 26,000 plants per hectare





## NAUTILUS F1

- Medium early, 65-80 days from planting
- A hybrid cauliflower cultivar, highly widespread in Europe
- Universal use
- High-quality curds – productive, big, and heavy
- Curds perfectly covered with leaves
- Tolerant to higher temperatures
- Upright foliage is an advantage: higher number of plants per hectare



# AUTUMN CAULIFLOWER WITH A SHORT GROWING PERIOD

## DELTA

- 70-75 days from planting to harvesting
- For late summer and autumn harvest
- Upright, dark green leaves
- White, well covered, considerably rough curds
- Sowing from the mid-April to the second half of June
- A spacing of 50 x 50 cm



## OCTAVIAN

- A medium late cultivar, 85-95 days
- For autumn harvest
- Plants of a rather robust structure and with dark leaves
- White, medium rough curds
- Resistant to purpling
- A spacing of 60 x 50 cm



## ANDES

- Summer to autumn cauliflower cultivar
- 110 days from planting to harvesting
- Curds of 0.8 kg, white, firm, and well domed, well covered with long oval leaves
- Good resistance to purpling and a moss-like structure
- Sowing from the middle of April to the end of May
- A spacing of 50 x 50 cm

## MONTANO F1

- An autumn cauliflower cultivar
- 110 days from planting to harvesting
- Universal and productive
- Well covered with leaves
- Resistant to purpling
- Sowing from the middle of April to the end of May

AUTUMN CAULIFLOWER  
WITH A LONG GROWING PERIOD  
WHITE BALL

- Cultivars with names starting with "White" have a very long growing period
- 160 days from planting:
- Planting of seedlings as early as in the middle of May
- It is not possible to plant a preceding crop whereas other late cauliflowers are only planted in the second half of June and enable a preceding crop to be deployed
- Big curds of 40 cm – perfectly covered with leaves
- Productive



## **WHITE FOX**

- 170-175 days

## **WHITE SUMER**

## **WHITE ROCK**

## **SIERRA**

- High yield, resistant to purpling

## THE CAULIFLOWER Romanesco

- Top-class in terms of taste, a buttery flavour, rather firm texture, vitamins B and C, rather succulent
- Demanded by luxury hotels, the price is twice as high as that of regular cauliflower

25 CZK/piece, the same cultivation methods, expensive seed

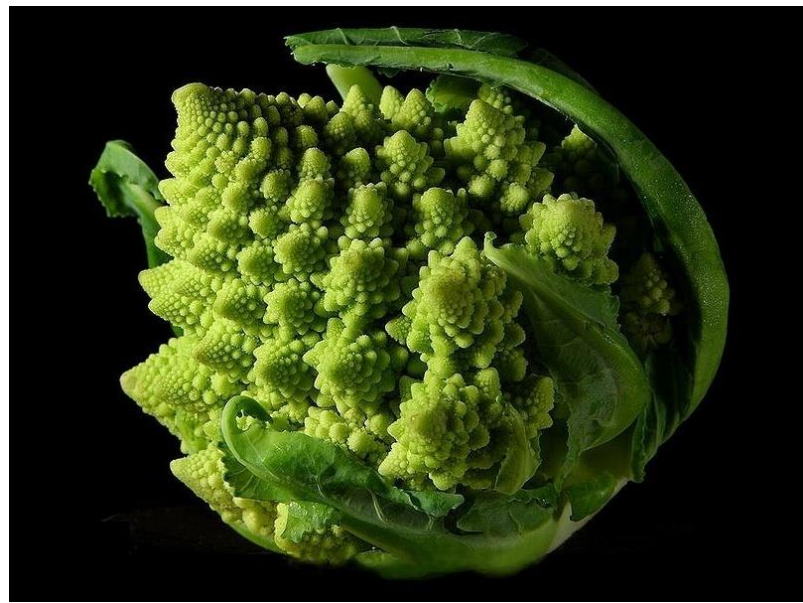
AMFORA F1 Foreign, medium late, autumn harvest

Medium-sized curds

SHANNON

Foreign, late, autumn harvest

Low demand, poor sales in shops





# BROCCOLI

(*Brassica oleracea* L. convar. *botrytis* var. *italica*)



# BROCCOLI

(*Brassica oleracea* L. convar. *botrytis* var. *italica*)

## Growing Conditions

- Preferably in beet production regions
  - Good results also on sandy soils of maize production regions that have sufficient humus levels
  - Yields are by one third lower than in beet production regions
  - Protection against flea beetles and *Meligethes*
- After planting: protection against hares and rabbits, use non-woven fabrics

## Nutrition and Fertilisation

- The same requirements as cauliflower
- A difference – need to dose N very carefully

(Broccoli accumulates most nitrates out of all cole crops)

## 1. Sprouting broccoli

(*Brassica oleracea* L. convar. botrytis var. italica)

- Less compact heads than those of cauliflowers
- More or less remontant forms (a cultivar characteristic)
- Central (top) head – the earliest and the largest with 10-15 cm, (after this head is harvested, 4 to 10 side heads 3-5 cm in size form within 2-5 weeks (in the leaf axils of the new side axis))
- Big growers only harvest the top heads





## 2. Heading broccoli

(*Brassica oleracea* L. convar. *botrytis* var. *botrytis*)

- Grown mainly in seaside regions – humid areas (Mediterranean, England, and France)
- Only top heads of a white, yellow or purple colour
- The broccoli is planted in the summer, overwinters at the stage of a leaf rosette and forms heavy and firm flower heads in the spring
- The broccoli cannot be grown in the Czech Republic (high temperatures and dry weather)
- A tall and strong stalk, longish leaves



## Broccoli Cultivation Techniques

Crop	Early	Summer	Autumn	
Sowing	20 January–10 February	1 March–25 May	1 June–10 June	
Planting	15 March–31 March	15 April–30 June	15 July–31 July	
Harvesting	15 May–1 June	15 June–1 September	20 September– 30 November	
Spacing	45 x 45	60 x 35	60 x 35	60 x 40
Number of plants	48,000-50,000	48,000	42,000	
Yield (t.ha-1)	8-10	10-20	20-30	

There is no flowering in the autumn.

TKW of 2.5-3.5 g

The head tolerates a frost of -8°C without being damaged

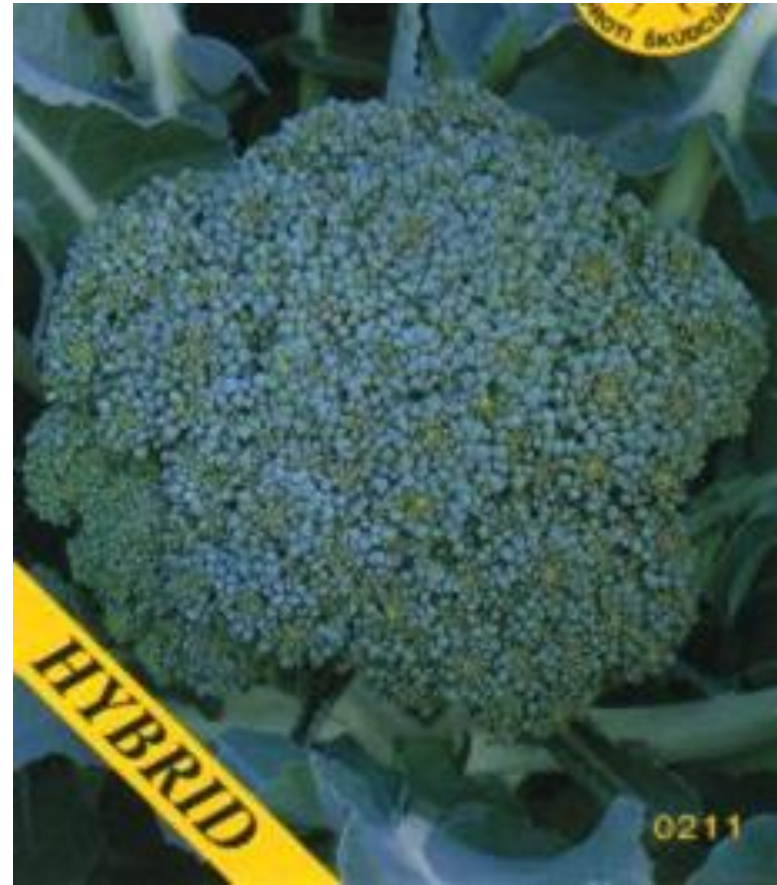
## LIMBA

- An early cultivar, 65-75 days from planting
- For summer and autumn harvest
- Medium-sized, green, and finely granular flower heads
- Direct consumption, industrial processing, and a short storage
- Besides the central head, the broccoli also forms smaller heads from side shoots
- Good resistance to bolting
- A spacing of 60 x 50 cm



## KERMIT F1

- A hybrid, medium early cultivar, 70 days
- For summer and autumn harvest
- For direct consumption as well as processing
- Large, firm heads
- A very widespread cultivar



## LUCKY F1

- A hybrid, medium early cultivar, 71 days from planting
- Universal: for spring, summer, and autumn harvest
- For direct consumption as well as industrial processing
- Firm, domed heads and fine buds
- High tolerance to fungal diseases





## LUCIE F1

- A hybrid, medium early cultivar, 75 days
- Universal: for spring, summer, and autumn harvest
- Firm, compact heads





## APOLENA F1

- A hybrid, medium late cultivar, 75-85 days from planting
- Universal: suitable for year-long cultivation
- For direct consumption as well as short storage
- Medium granular, medium to large heads of up to 1 kg, blue-green
- Resistant to bolting
- Delicate flavour, fine stalk, also suitable for direct consumption without cooking
- A spacing of 50 x 50 cm



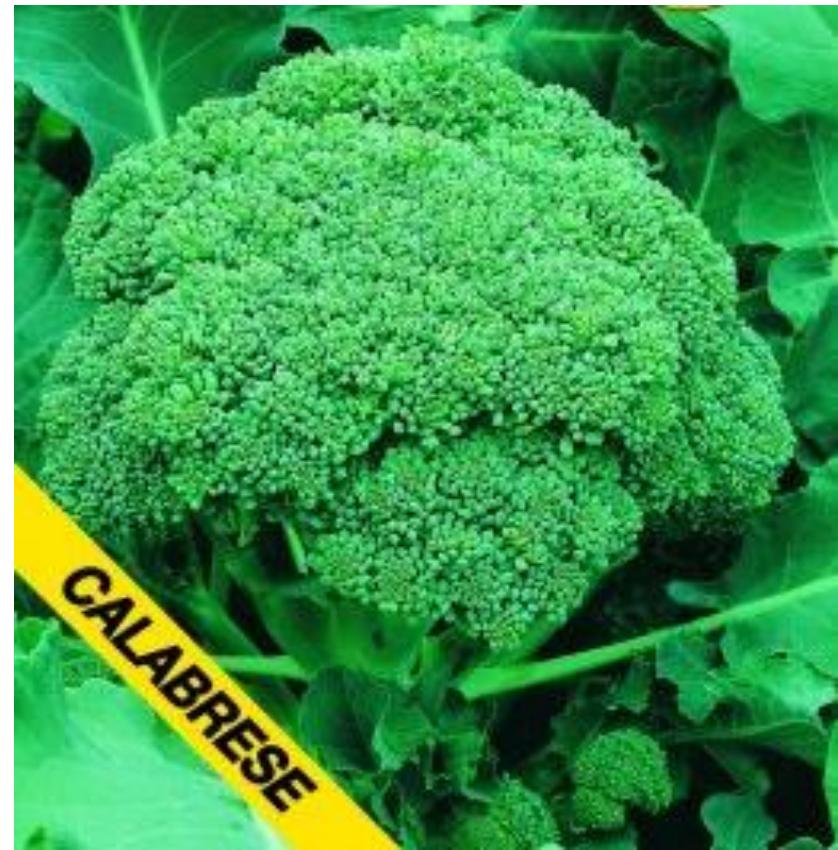
## LEONORA

- A medium late cultivar, 75-85 days from planting
- Suitable for autumn cultivation
- Designated for direct consumption as well as a short storage
- Finely granular, medium-sized heads of up to 700 g and a medium green colour
- Without any purple colouring
- A spacing of 50 x 50 cm



## CALABRESE

- A medium late cultivar; 80 days between planting and harvesting
- For summer and autumn harvest
- A considerably remontant (regrowing) cultivar for gradual harvesting of heads
- Central heads: 8-10 cm
- Side heads – smaller  
(growing out from leaf axils)



## LORD F1

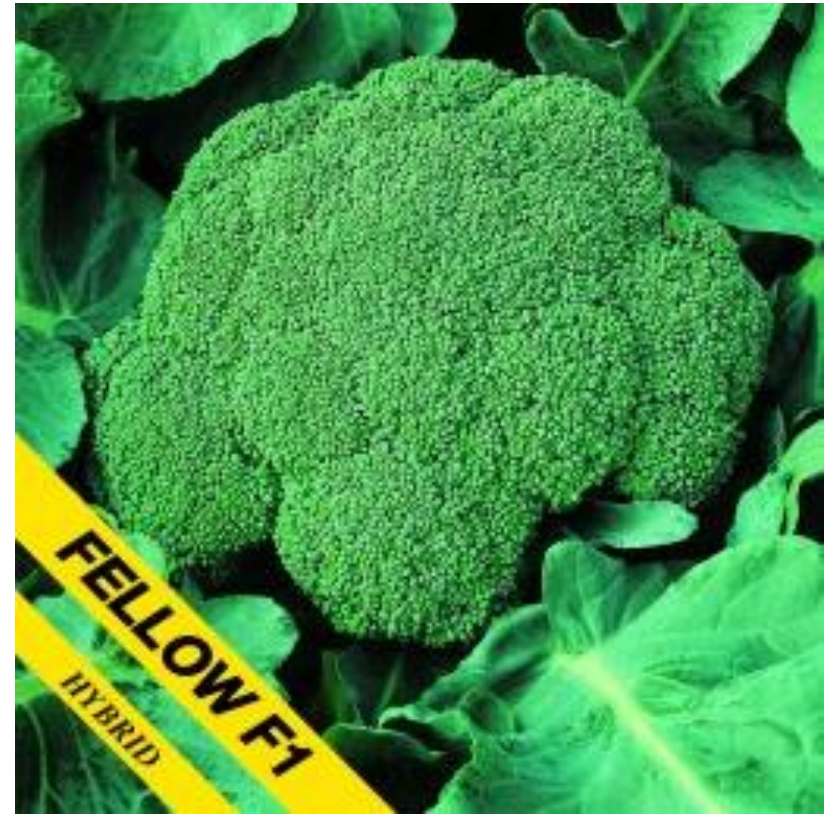
- A hybrid, medium late cultivar, 80-90 days
- Universal: year-long cultivation
- High-quality, firm, and compact heads





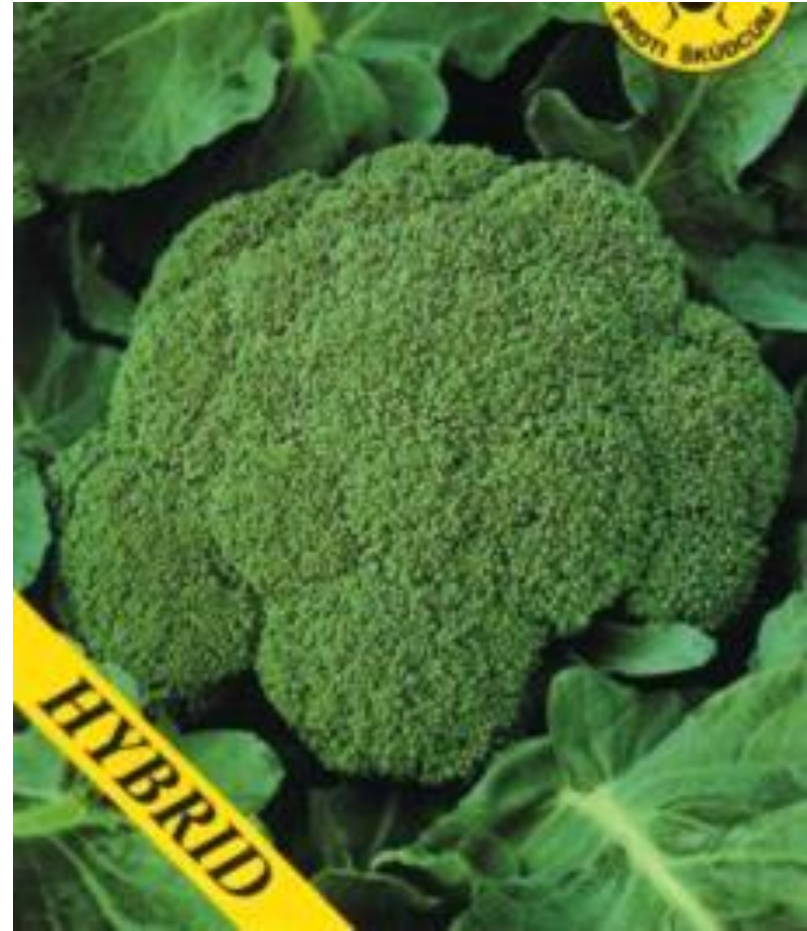
## FELLOW F1

- A hybrid, medium late cultivar, 85-90 days from planting
- Universal: for year-long cultivation
- The cultivar can be grown from early seedlings under plastic sheets
- Well-tried, tolerant to stress
- After harvest of prime heads, smaller, firm heads grow out of side shoots



## CORVET F1

- A hybrid, medium late cultivar, 85-90 days from planting
- Universal: year-long cultivation (remontant)
- Pliant, stress-tolerant
- Medium-sized heads





## MIRANDA

- A medium late cultivar, 95-105 days from planting
- For autumn cultivation
- For direct consumption
- Large, purple heads
- A spacing of 60 x 60 cm



## BUCCANEER F1

- For summer and autumn harvest
- Big buds
- A rather coarse head texture which does not affect the taste
- High levels of vitamins
- A top-quality cultivar for small growers (coarse texture)

## SHADOW F1

- For summer and autumn harvest
- High levels of vitamins
- Small growers (coarse texture)
- Large, very firm heads

## COLONEL F1

- A very early cultivar
- For summer and autumn harvest
- Prone to bolting

Foreign hybrid F1 broccolis Yield of 25-30 t/ha

□□FIESTA, FLASH, MARATHON,  
SWITCH, MONAKO, SKIFF

Czech hybrid F1 broccolis

□□LUCIE □□CEZAR

□□LIMBA (rather coarse – for hobby gardeners)

Not recommended to grow:

VITAMINA

- Non-hybrid, originated in the Czech Republic in 1963, lower yield (6 t/ha), small heads

GEBA

- Non-hybrid, Germany, lower yield

## BORECOLE GREENS – (SAVOY)

(*Brassica oleracea* L. convar. *oleracea* var. *acephala* DC.) Stalk: 0.3-0.9 m  
– mostly 0.6-0.7 m; a plant having 15-20 leaves, the weight of a leaf being  
150-200 g

Savoy tolerates frost of up to  $-15^{\circ}\text{C}$

Abroad – three savoy leaves packaged and sold frozen





## Cultivation Techniques

- Sowing – precision sowing machines
- Given the late harvest date: end of April until beginning of June
- Row spacing: 50-70 cm, 40-70 cm apart in a row
  
- Mini-plugs:
- Sowing from mid-April
- Seed consumption per hectare: 0.3 kg (pre-cultivated planting stock)
- Planting in June
- Spacing: 80 x 60 cm, 80 x 80 cm
- Conduct inter-row hoeing 1-2 times
- When overwintering savoy, protect it against deer

## Savoy Cultivars

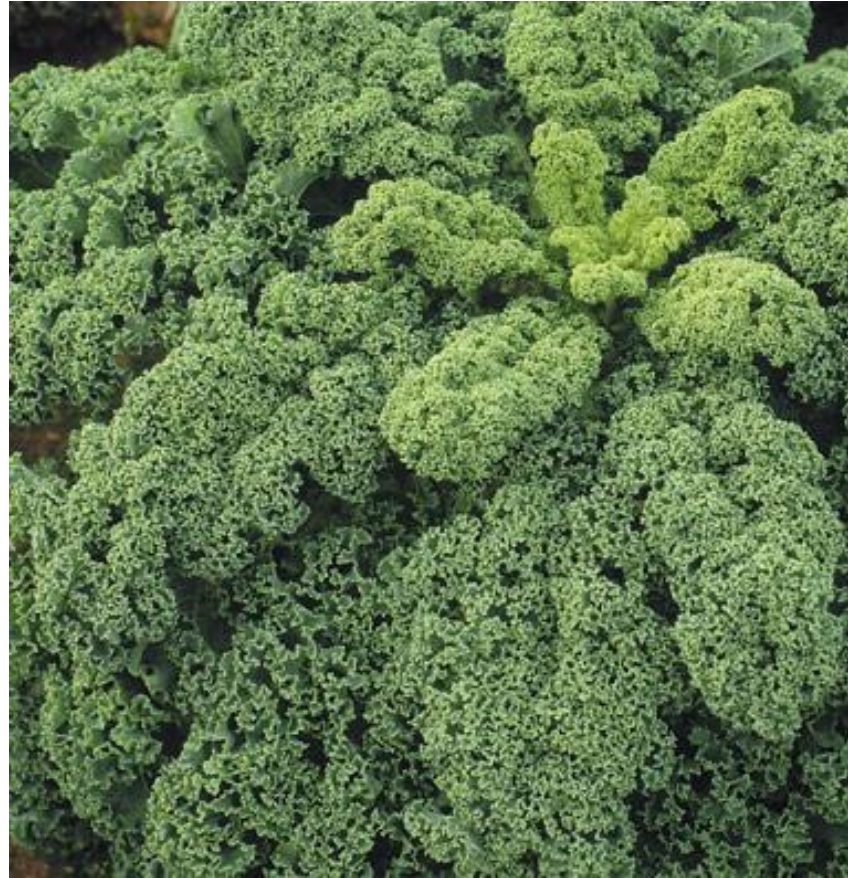
### SAMBOR F1

- Medium late
  - A medium tall stalk (0.7 m)
  - Fine, pale green foliage
  - Also for processing at freezing plants
- Sowing from the end of April to the beginning of June
- For harvest in September–December  
(leaves turn brown at a later date)
  - A cultivar not in demand any more



## WINTERBOR F1

- Late
- A medium tall stalk
- Resistant to uprooting
- Dark green, slightly curly, and crisp leaves
- This savoy overwinters perfectly
- Sowing in May–June – for harvesting between September and March
- During winter, this savoy's leaves turn yellow to a smaller degree than in other cultivars



## KAPRAL

- A medium early cultivar
- For direct consumption
- Plants of 40-60 cm (medium tall)
- Dark green, crisp, fine, crinkly, and very curly leaves
- Resistant to flowering
- Tolerant of temperatures as low as  $-15^{\circ}\text{C}$
- A larger surface of the leaf rosette
- A spacing of 80 x 60 cm





## KAPITAN F1

- A hybrid, medium early cultivar
- The plant is 70 cm tall, takes up lot of space
- Resistant to uprooting
- Leaves are medium green and very curly
- Tolerant to temperatures as low as  $-15^{\circ}\text{C}$
- The spacing is 80 x 60 cm



## KADET

- Medium late variety
- Plants of 60-80 cm – medium tall
- Medium green, crinkly, and very curly leaves
- Tolerance to frost as low as  $-15^{\circ}\text{C}$
- A smaller surface of the leaf rosette
- A spacing of 60 x 60 cm
- Delicious





## ROSSIGNOL

- Medium late variety
- For direct consumption
- Plants: 60-70 cm tall
- Dark green, very curly, narrow, upright leaves; the plant looks very decorative
- Tolerant to temperatures as low as  $-15^{\circ}\text{C}$
- Resistant to the stalk uprooting
- The spacing is 50 x 50 cm



## TINTORETO

- Medium late variety
- For direct consumption
- Plants are 70-80 cm tall and uniform
- Leaves are pale green, crinkly, and very curly
- Resistant to uprooting
- Tolerant of temperatures as low as  $-15^{\circ}\text{C}$
- A spacing of 80 x 60 cm



## SYMPATIC

- Medium late variety
- For direct consumption
- Plants are 60-70 cm tall and uniform
- Resistant to uprooting
- Leaves of a vivid purple colour, crinkly, very curly
- Distinctive resistance to frost – tolerant even to  $-18^{\circ}\text{C}$
- Due to its dark colour, this savoy appears – particularly on snow-covered fields – very decorative
- The spacing is 80 x 60 cm





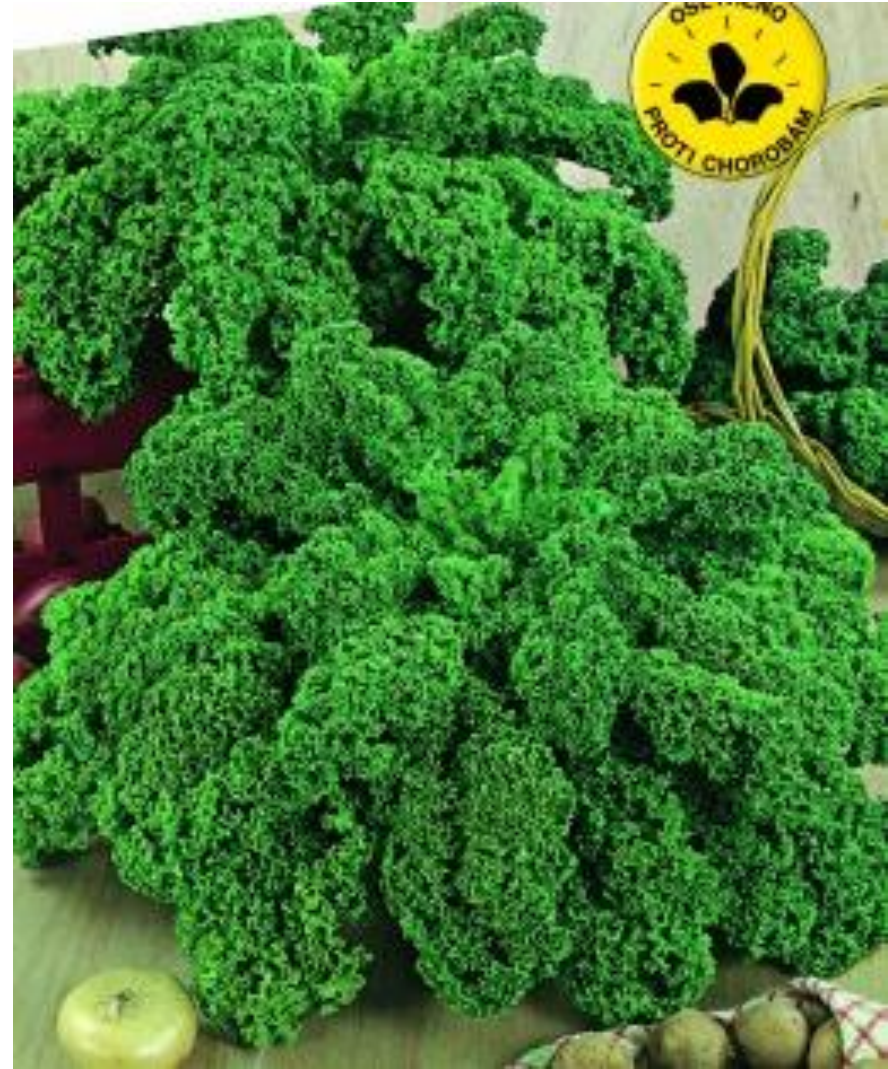
## SCARLET

- A medium late to late cultivar
- Plants are 80-120 cm tall, susceptible to uprooting
- Green-purple, crinkly, very curly leaves that turn deep blue-purple after the first frost
- In winter months with a blanket of snow, this savoy has a profound decorative effect
- Distinctive resistance to frost:  $-18^{\circ}\text{C}$
- A spacing of 80 x 60 cm



## HALBHOHER GRÜNNER KRAUSER

- Early
- A productive, medium tall savoy
- Resistant to bolting
- Green, narrow oval, very curly leaves
- Crisp and delicate
- The only cultivar in past



## HAMMER

- Short – only 30 cm in height
- Pale green, productive
- Suitable for the sale of whole leaf rosettes and for direct consumption

## WESTLÄNDER HALBHÖHER

- High-quality leaves
- For autumn and winter harvest
- High yields
- For industrial processing





45.







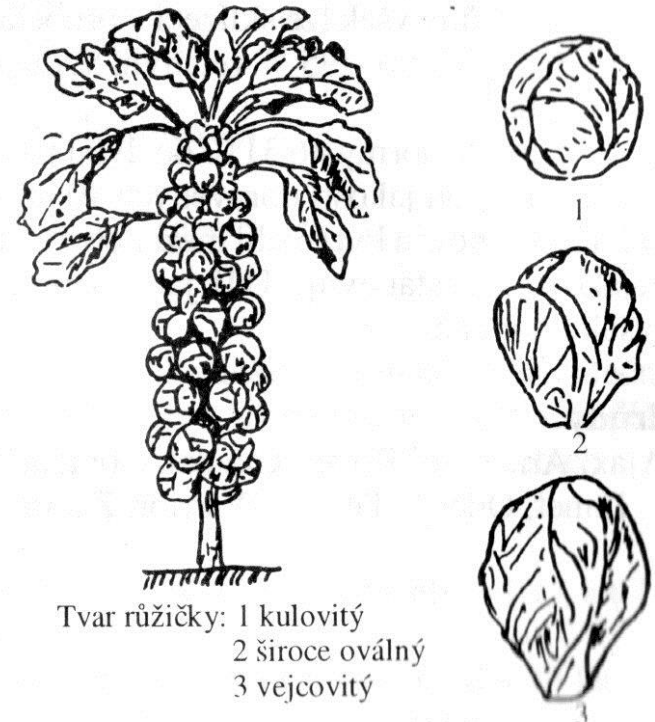




# BRUSSELS SPROUTS

(*Brassica oleracea* L. convar. *oleracea* var. *gemmifera* DC.)

- A choice vegetable which is high in vitamins
- Fine fibre, easy to digest
- A stalk of 0.3-1.2 m :
- It is no use growing plants with a short stalk under 0.5 m in height (the largest sprouts get damaged when harvested)
- Preferably half the height of the plant, which is 0.8-1 m
- A tall stalk – uprooting!
- Brussels sprouts withstand frost of –12°C to –15°C
- Brussels sprouts require high humidity
- Preferably in potato production areas but Brussels sprouts are convenient for all of the other production areas, too



## Brussels Sprouts Cultivars

Foreign cultivars are productive whereas Czech cultivars have yields lower by 50%

Do not grow: ZÁVITKA, ROSETA, KARPO

☐☐A medium tall type – a stalk of 0.8-0.9 m

ESTATE F1

- An excellent cultivar
- Highly frost-resistant

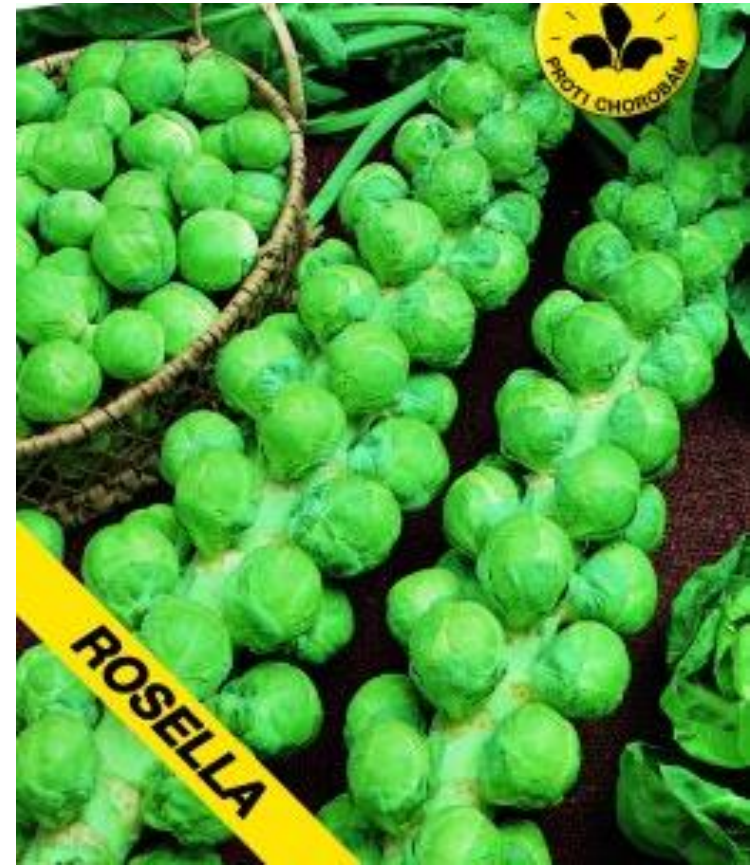
DASHER F1





## ROSELLA

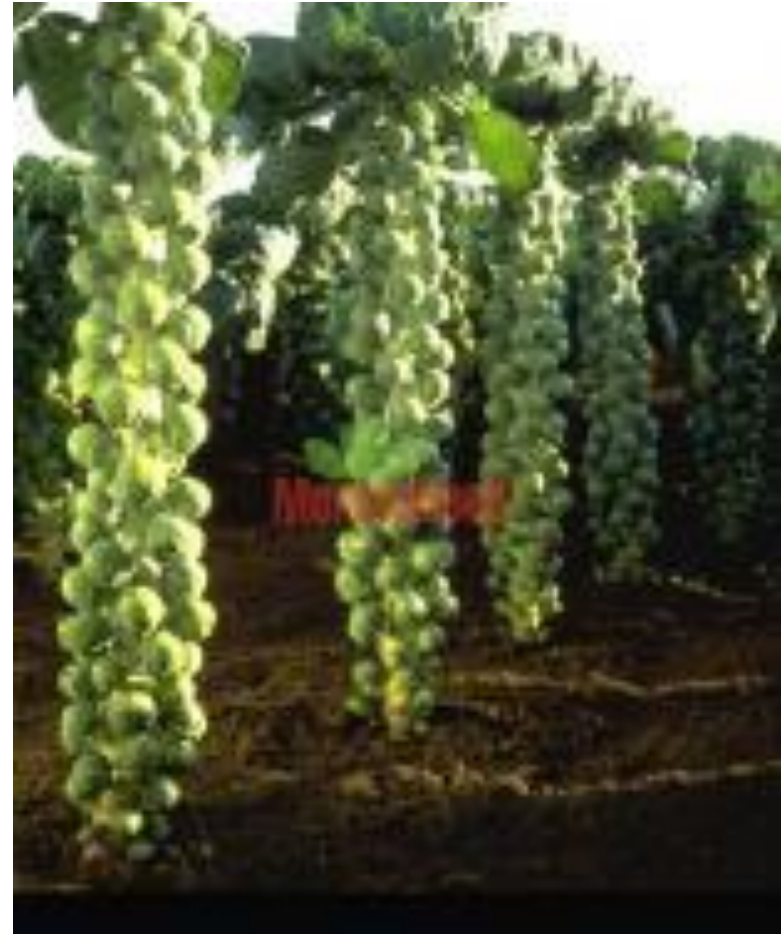
- A medium early cultivar, 140 days from planting to harvesting
- A medium height: 80 cm
- Plants have dense foliage and a robust top sprout
- Sprouts are firm and yellow when cut open, with a longish and rather thick inner stalk
- For a proper development of sprouts, plants need a sufficient amount of water when the sprouts are forming



A tall type – a stalk of over 1 m

## DOLORES F1

- A hybrid, early cultivar, 120-130 days from planting
- Plants of 100-110 cm in height with a central top sprout
- Suitable for one-off harvest
- Medium green, well packed, and uniform sprouts
- Resistant to uprooting and lodging
- A spacing of 60 x 50 cm



## LUNET F1

- A medium early cultivar, 140 days from planting to harvesting
- A large height of 110 cm
- A large number of big, dark green sprouts with a smooth surface





## CASIOPEA

- A medium late cultivar, 155-165 days from planting
- Suitable for gradual harvesting
- Plants of 110-125 cm in height with a rather large top sprout
- Dark green sprouts are rather small, densely clustered, firm, with a medium inner stalk
- Good resistance to frost, uprooting, and lodging
- A spacing of 60 x 50 cm



**CITADEL F1**

**KARAT F1**

For hobby gardeners  
Sprouts located at the

**BOXER F1**

**STABOLITE**





In the whole of the Czech Republic, Brussels sprouts are grown by 2 growers on two areas of 50 ha each. They harvest mechanically after the ground has frozen.

Brussels sprouts are a perfect vegetable for hobby gardeners.

Their significance lies in cancer prevention – high levels of fibre.

When there is a risk of the plants freezing (below  $-15^{\circ}\text{C}$ ), it is possible to transfer them with the rootball indoors or pull them with the stalk out of the ground (sprouts on the stalk stay fresh).

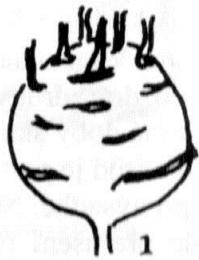
# KOHLRABI

*Brassica oleracea* L. convar. *acephala*

Cultivars:

- White - Early, prone to lignification, with less foliage
- Prone to splitting and flowering
- Purple - A thicker skin, resistant to lignification and splitting, juicy pulp

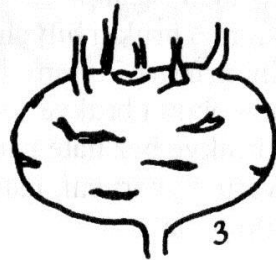
Axial tuber (bulb)



Round



Flat-round



Flat



Oblong round



## Sowing

## Planting

## Harvesting

## Spacing

EARLY CROP	SUMMER CROP	LATE CROP
Beginning of February	March–April	May/June, end of
End of March	April–May	May–middle of July
May–June	June–August	August–October
25 x 25	30 x 30	40 x 40
	Not grown, no demand or sales	

## EARLY CROP FOR LATE HARVESTING

Sowing Mid-July Growing period from sowing in days

Planting Mid-August

Harvesting September –October

Early blue 80-96

Early white 75-90

Medium early 110-120

Late 130-150

Spacing 30 x 30

There is a need to grow early cultivars that have small tubers: not profitable

## Early Cultivars

### LUNA

- A very early cultivar, 75-80 days from sowing
  - For forcing and year-long field growing (not conducted by any growers)
  - Round, rather robust tubers
  - Highly resistant to bolting, lignification, and splitting
  - When grown in spring, the cultivar requires regular irrigation
  - The spacing is 25 x 25 cm
  - Not grown in summer
- There are TROJA and SPARTA





## KREF F1

- A very early, hybrid cultivar, 75-80 days from sowing
- For forcing and year-long field growing
- Flat-round tubers with fine and delicious inner pulp
- Resistant to splitting, lignification, and tuber overgrowing
- A spacing of 25 x 25 cm
- Not grown in summer, there are TROJA and SPARTA



## KORFU F1

- A very early, hybrid cultivar, 75-80 days from sowing
- For forcing of all types and for year-long field growing
- Flat-round, pale green tubers with fine, quality pulp
- Resistant to lignification, splitting, bolting and tuber overgrowing
- A spacing of 25 x 25 cm
- Not grown in summer, there are TROJA and SPARTA



## KARTAGO F1

- An early, hybrid cultivar, 77-82 days from sowing
- Suitable for forcing and very early field growing, but also for growing from summer sowing for autumn harvesting
- Dense upright foliage
- Fine pulp
- Resistant to lignification and tuber overgrowing
- A spacing of 30 x 25 cm
- Not grown in summer, there are TROJA and SPARTA



## MODRAVA F1

- A very early, hybrid kohlrabi, 72-75 days from sowing
- For spring and autumn harvest
- Quality, uniform tubers even in bad conditions
- Flat-round, deep purple tubers
- Resistance to lignification and splitting, and high resistance to bolting
- A spacing of 25 x 25 cm





## BALLOT F1

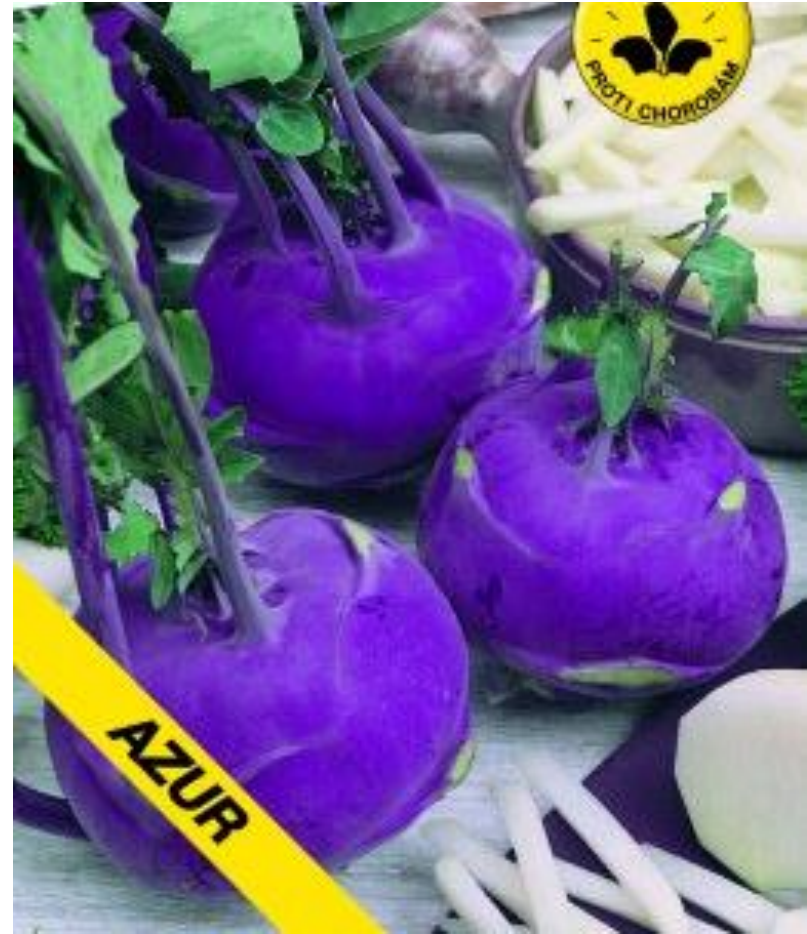
- An early, hybrid cultivar, 75-80 days from sowing
- For spring and autumn field growing
- Flat-round tubers with high-quality, fine pulp
- Resistant to lignification, bolting, and splitting
- A spacing of 25 x 25 cm





## AZUR

- An early cultivar, 75-80 days from sowing
  - Year-long cultivation: for early field growing and direct sowing from April to July, and for harvesting from the beginning of July to October
  - Resistant to splitting and lignification, medium resistant to bolting
  - A spacing of 25 x 25 cm
  - Not grown in summer
- There are TROJA and SPARTA



## BLANKYT

- An early cultivar, 80-85 days from sowing
  - Year-long cultivation
  - Poor foliage
  - Resistant to splitting, bolting, lignification
  - A spacing of 25 x 25 cm
  - Not grown in summer
- There are TROJA and SPARTA



Cultivars for Forcing – in greenhouses – not conducted very frequently – a matter of economy

### DVORANA

- Very early, distinctive earliness – 63 days from planting
- Designated for all types of forcing
- Resistance to bolting and deforming of tubers in poor light conditions and at low temperatures
- The cultivar forms smooth, juicy, flat-round, and pale green tubers

KARTAGO F1 KORFU F1 KREF F1 LUNA



<b>Type</b>	<b>Dates</b>		<b>Cultivar name</b>	<b>Recommended spacing (cm)</b>	<b>Growing period (No. of days from sowing)</b>
	Sowing date	Harvesting date			
<b>For forcing</b>	September to January	January to May	DVORAN A	25x20	<b>63</b>
<b>Field early</b>	February to April or July	May to June or October to November	MORAVI A	25x25	<b>70</b>
			BLANKY T	25x30	<b>80</b>
			AZUR	25x30	<b>80</b>
			MODRAV A F1	25x30	<b>72</b>
<b>Field late</b>	<b>April to May</b>	<b>September to October</b>	VIOLETA	30x40	<b>115</b>
			<b>GIGANT</b>	<b>40x40</b>	<b>130</b>

## Summer Cultivars (Medium Early)

These cultivars come on the market in July and then gradually until October

Top-class European cultivars in the Czech Republic:

### TROJA F1

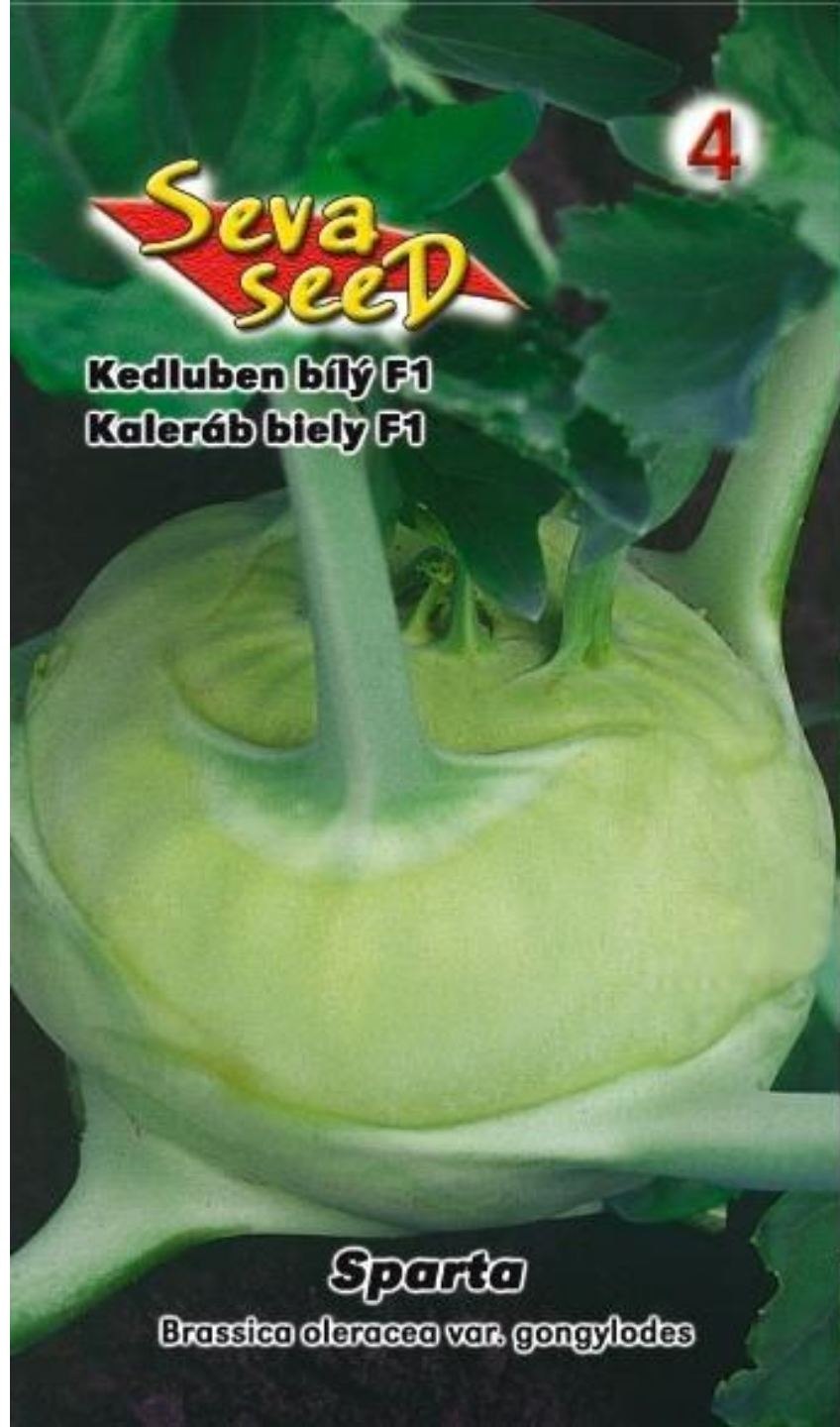
- A medium late to late hybrid cultivar, 110 days from sowing
- For spring and summer field growing, but also for autumn growing from summer sowing
- Resistant to lignification and tuber overgrowing
- Large, flat-round tubers of 500 g and 15-18 cm in diameter
- Distinctive pulp tenderness
- A spacing of 40 x 30 cm
- To be stored until March
- Harvest can be postponed without the tuber quality being deteriorated





## SPARTA F1

- A medium late to late hybrid cultivar, 110 days from sowing
- Large tubers of 500 g
- High-grade
- Resistant to splitting, lignification, and overgrowing
- A spacing of 40 x 40 cm



## Late Cultivars

### KOZMANOVA MODRÁ ("THE KOZMAN PURPLE")

- A medium late cultivar; 120 days from sowing to harvesting
- For summer and autumn harvest and a short storage
- Tuber weight of 0.6 kg
- DO NOT GROW: the crown of the tuber is dented:
- Water is trapped there
- Rotten tubers are harvested in autumn



## VIOLETA

- A late cultivar, 110-125 days from planting
- For autumn harvest
- Tubers of 0.5-0.7 kg
- A distinctive delicate taste
- Easy to grow
- Highly resistant to lignification and splitting
- Possible to store for 2-3 months
- A spacing of 40 x 30 cm



## GIGANT

- A late cultivar, 130-150 days from sowing
- Originated in the Czech Republic, originally as a fodder cultivar
- For autumn harvest
- Large tubers of 2 kg
- No lignification or splitting
- A greater spacing: 50 x 40 cm

