



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**

Fruit-bearing vegetables

RAJČATA

Lycopersicon lycopersicum L.
(*Lycopersicon esculentum* Mill.)

- TOMATOES - *Lycopersicon lycopersicum* (L.)
(*Lycopersicon esculentum* Mill.)
- • Fresh fruits – direct consumption
- • Salads, purees, ketchups, juices
- • Support blood circulation and kidney function
- • Juice cleans and softens complexion, reduces acne and firms the skin



- Nutritional values
- Dry matter 5.0-6.5%
- Carbohydrates 4.0-5.0%
- Proteins 1.1%
- Fibre 1.0-1.5%
- Fats 0.3%
- Pectin 0.13%
- Mineral substances 0.6%
- Organic acids 0.5%



- Mineral substances
(mg.1000g⁻¹)
- Ca 260
- P 260
- Mg 200
- Cl 600
- K 2,970
- S 188
- Zn 2.2
- Fe 12
- Mn 1.4

- Vitamins (mg.1000g-1)
- Classification of varieties according to technology of growing:
 - 1. Climbing varieties for direct consumption – table varieties, pre-grown seedlings, manual harvest
 - 2. Bush varieties for direct consumption – usually from pre-grown seedlings – requested by customers, manual harvest
 - 3. Bush varieties for industrial processing

Requirements on table varieties

- Taste (higher content of acids)
- Resistance to pathogens (viral, bacterial and fungal pathogens)
- Resistance to cracking and rapid softening (transportability)
- “Long life” varieties
- Newer varieties with genetically longer durability
- Stay firm 14-18 days after maturation
- Do not soften after colouring on plant
- Do not crack
- Longer shelf-life
- Taste + / -
- Customer wants red, firm tomato

Requirements on bush varieties for industrial processing

- Resistance to cracking and firmness
- Resistance to pathogens
- Content of refractometric dry matter
- The higher, the more favourable for the production of purees and ketchups - shorter processing time, less water
- Usually have thicker peel – more resistant
- “Long life” varieties

Climbing (indeterminate) varieties

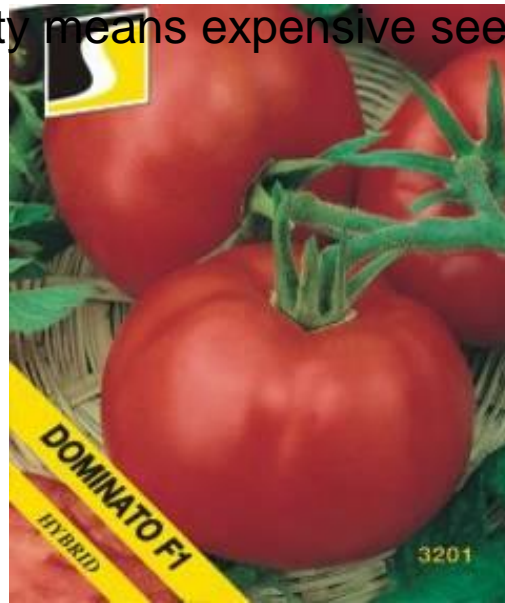
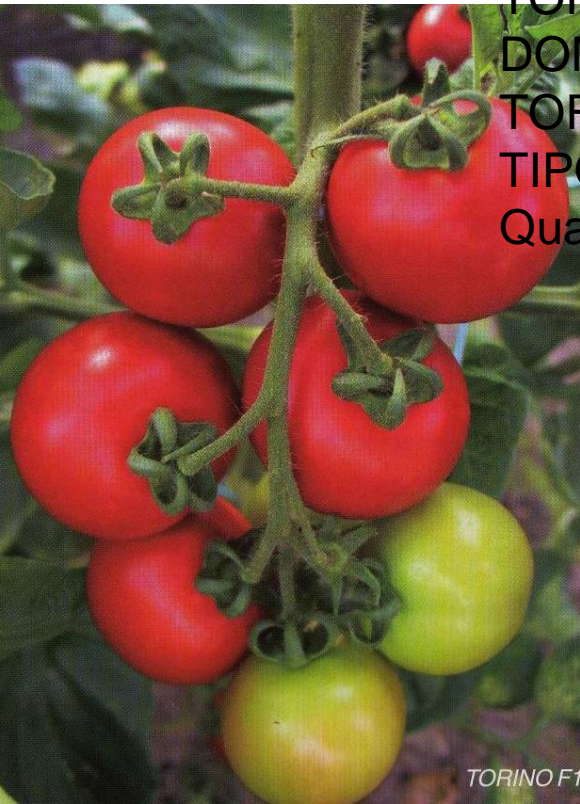
TORINO F1 – no cracking

DOMINATO F1 - no cracking

TORO F1 - no cracking

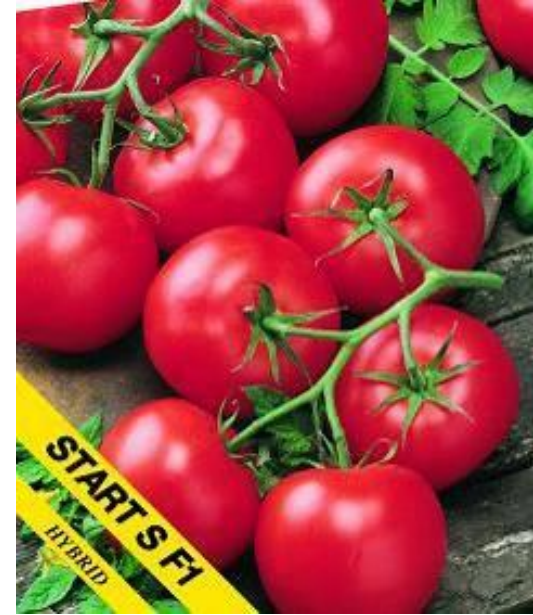
TIPO F1 - no cracking

Quality means expensive seeds



ORKADO F1

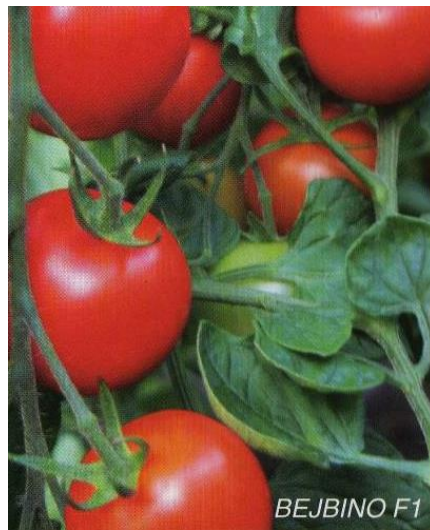
- Does not crack, big fruits – “START F1”
- Early and tasty tomatoes; small fruits, greenish around stalk “PEDRO”
- For greenhouses and outdoor growing; big fruits, do not crack “PARTO F1”
- Medium resistance to cracking, big fruits



“BEJBINO”

“Baby” – “cocktail tomato”

- Very early
- Very tasty small fruits – diameter is 2–3cm
- Weight is 30–40g



ORANŽE”

- Yellow fruits
- Big fruits
- Prone to cracking and being over-mature
- Very fertile

“MINIGOLD”

- Yellow fruits
- Small fruits

DO NOT GROW:

“SLÁVA PORÝNÍ”

- Old variety (1943), variety is prone to moulds

- Cheap seeds (700 CZK/kg, other varieties cost 18-50 thousand CZK/kg seeds)

- Producers of seedlings pretend that this is a Dutch variety and sell them on the market, the variety cannot be recognized (12-15 CZK/seedling) => better to buy original seeds and grow them!

“STUPICKÉ” POLNÍ RANÉ

- Matures early, first harvest is good, then the fruits are smaller



DO NOT GROW:

“BONZET F1”

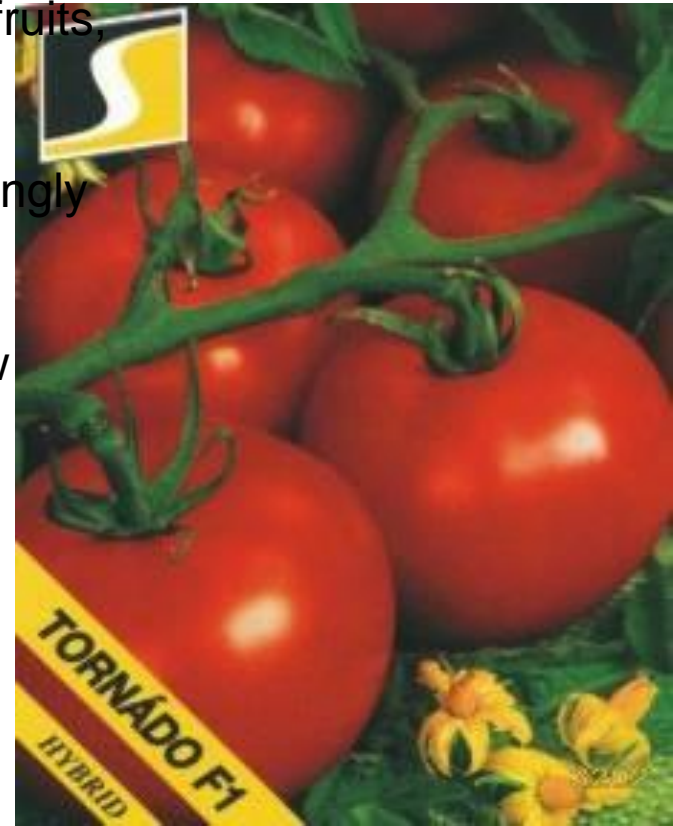
- Suffer from tomato blight - most prone, once excellent, very tasty, with big fruits, perfect tomato for salads

“TORNADO F1” (!)

- Tasty, plastic, very fruitful, but strongly cracking

“DOMINO F1”

- Cracking, very fruitful, do not grow



Bush varieties for manual harvesting
“DIANA”

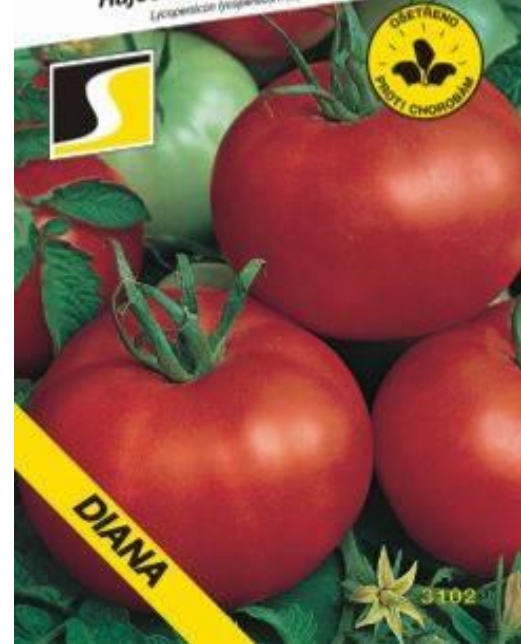
- Very early, matures around 25th June
- Big fruits, quickly over-matures, thin peel

“ESKORT”

- Very early, matures at the beginning of July
- Smaller firm fruits, matures early – manual harvest

“PAVLINA”

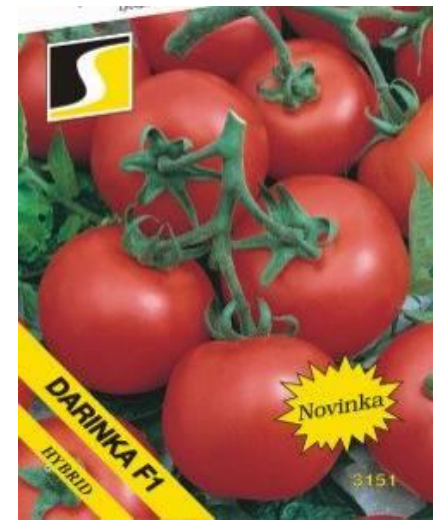
- Very good with big fruits – intolerant to mechanized harvest
- “Long life” – lasts firm for 14 days
- Thick peel



Bush varieties for mechanized harvest
For direct consumption and industrial processing: (domestic varieties; tastes good)

“MARIENKA F1, DARINKA F1”

- Hybrid variety
 - Early variety, appropriate also for direct consumption – tasty (higher content of acids)
 - “Long life” variety; spherical medium big fruits with excellent yield
 - Perspective - probably will prevail over other bush varieties
 - 1 kg of seeds costs 23,000 CZK
 - Has bigger fruits than “PROTON”
- “PROTON”
- Appropriate also for direct consumption - tasty (higher content of acids)
 - For direct consumption and industrial processing



For industrial processing: (purees... small content of acids –worse taste)

“ODEON”

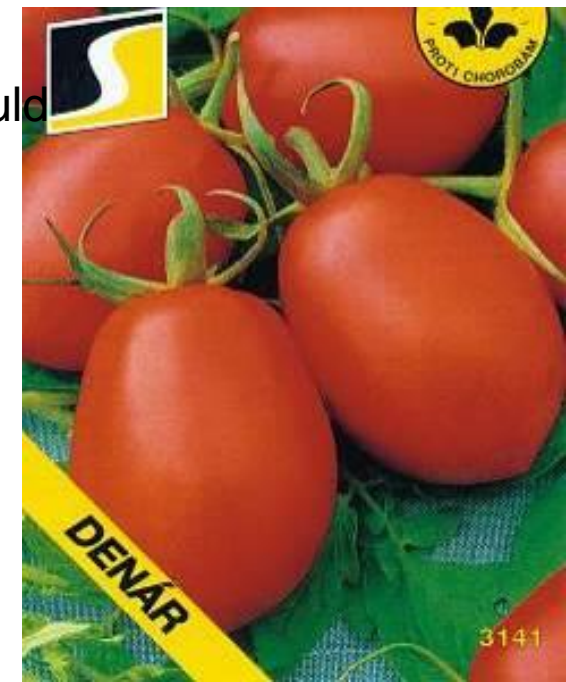
- Single harvest
- Elliptical smaller fruits, 50-70 g
- Poor taste- small content of acids

“DENÁR”

- High yield, prone to mould, has a significant tip at the end of the fruit → mould appears there

- Dry season: a very fertile variety

“SALUS, ŠEJK, OPÁL, TITAN”



“ANETA”

- Big fruits
- Slowly over-mature
- Mechanized harvest

“ROBURA” –not grown, lower yield

“RADKA”

“EVA”

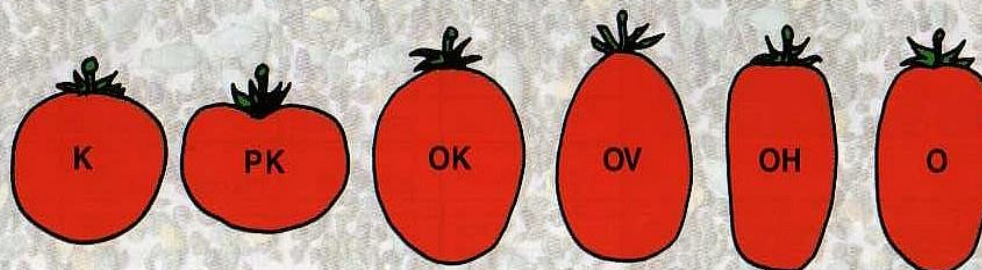
“HANA”

| Hlavní způsob využití (hlavní typ sklizeň) | Název odrůdy | Ranost | Habitus (vzrůst) | Plod | | | | | Poznámky |
|--|--------------|----------------|------------------|------|---------|--------------|-----------------|--------------|--|
| | | | | tvar | pevnost | hmotnost (g) | barva Index a/b | sušina °Brix | |
| Výroba kečupů (ruční sklizeň) | ESKORT | raná | rozkladitý | OV | P | 90-110 | 1,8-2,0 | 5,0-5,5 | Tvoří plody nad listy, snadno se sbírá |
| | PAVLÍNA | středně raná | rozkladitý | PK | P | 120-160 | 1,9-2,1 | 5,0-5,7 | Velmi výnosná odrůda |
| | DENÁR | středně pozdní | rozkladitý | OH | P | 90-110 | 1,9-2,1 | 5,3-5,7 | Výnosné, typicky kečupové rajče |
| Výroba kečupů, konzervování celých loup. plodů (mechanizovaná sklizeň) | ŠEJK | raná | polorozkladitý | O | P | 80-90 | 2,0-2,2 | 5,0-5,5 | Vyniká intenzivní barvou duniny |
| | SALUS | raná | kompaktní | O | VP | 70-90 | 1,8-2,0 | 4,8-5,3 | Výhodný i pro těžší půdy |
| | ORBIT | středně raná | kompaktní | O | VP | 70-80 | 1,9-2,1 | 5,0-5,5 | Odolný k suchu a vysokým teplotám |
| Přímý konzum, výroba kečupů (ruční i mechanizovaná sklizeň) | MARIENKA F1 | velmi raná | polorozkladitý | PK | P | 100-110 | 1,8-2,00 | 5,0-5,5 | Hybridní rajče na přímý konzum |
| | DARINKA F1 | velmi raná | polokompaktní | K | P | 90-100 | 1,9-2,1 | 4,8-5,3 | Hybridní rajče na přímý konzum |
| | SEMAROL | raná | polokompaktní | OK | VP | 80-90 | 1,9-2,1 | 5,0-5,5 | Velmi výnosná odrůda |
| | PROTON | středně raná | polorozkladitý | OK | VP | 80-90 | 1,9-2,1 | 5,0-5,5 | Optimální pro ruční předsběry a následnou mechanizovanou sklizeň |
| | TRITONEX | středně pozdní | polokompaktní | OK | VP | 80-90 | 1,9-2,1 | 5,3-5,7 | Optimální pro ruční předsběry a následnou mechanizovanou sklizeň |

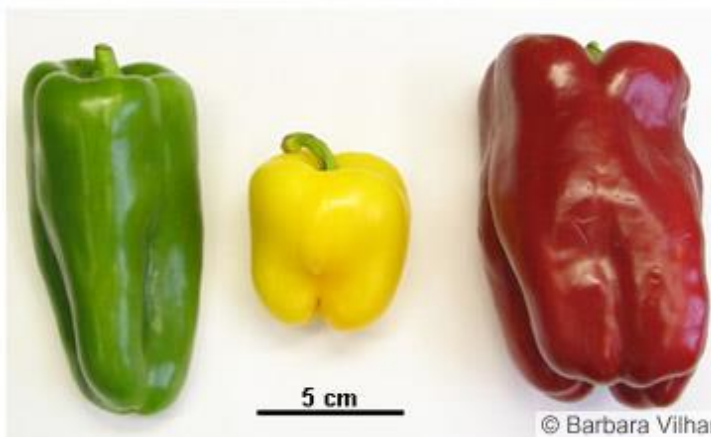


MARIENKA F1

Tvar plodu: PK = ploše kulatý, K = kulatý, OK = oválně kulatý, OV = oválně vejčitý, OH = oválně hranatý, O = oválný
Pevnost: P = pevný, VP = velmi pevný



- Bell pepper - *Capsicum annuum* L.
- Origin
- • Central America – Mexico





Nutritional values

Dry matter 7.0%

Carbohydrates 2.6%

Protein 0.8%

Fibre 1.9%

Alkaloid capsaicin – spicy taste

- Especially in placenta, seeds and internal membranes

Mineral substances (mg.1000g⁻¹)

Ca 80

P 190

Mg 100

K 1,700

S 210

Zn 1.0

Fe 4.0

Mn 1.0

I 0.01

C 1,200

Provitamin A 2.7

- Technical maturation 0.2- 2.0

- Botanical maturation 6-35

B1 0.4

B2 0.3

B6 3.0

E 8.0

Vitamins (mg.1,000g⁻¹)



- In stage of consumption maturation
- • Colour is green, yellow, red, white, brown
- • Czech consumer prefers red pepper, yellow in Hungary
- In stage of seed maturation:
 - • All fruits are red
 - • When the fruit turns red, seed is already germinating
 - • Immature harvested seed turns brown and is not germinating



Shape



Pyramidal

conical

Long conical

Quadratic Apple-shaped

Quadratic fruit – type of very late bell pepper varieties – mature at the beginning of September – only 1 harvest – end of vegetation.

Apple-shaped fruit – only for direct consumption – cannot be prepared like stuffed peppers, only for “lečo” dishes and for direct consumption.

Strong-growing varieties with big thick-peel fruits

- Grown in CR only in greenhouses and constructions for forcing
- "Californian peppers"
- High requirements on growing conditions
- Require support
- Not forced nowadays
- 9-10kg bell peppers may be harvested from 1m², while tomatoes provide 30-45kg – preferable



Varieties for field growing – varieties of weaker growth with medium big fruits

Domestic varieties:

“JOVA” - early, thick-peel and tomato-shaped, “MARYŠA” – appropriate for harvest in technical and botanical maturation, bell pepper-shaped and thick-peel, “SVĚTLANA” – very early, bell pepper-shaped; colour is yellow green with high content of vitamin C

“ZORKA” - semi-early, light green with worse yield



“AMY”

- Most commonly grown, productive, sweet
- disadvantage: yellow colour (green would be better)

“SUPER AMY F1”

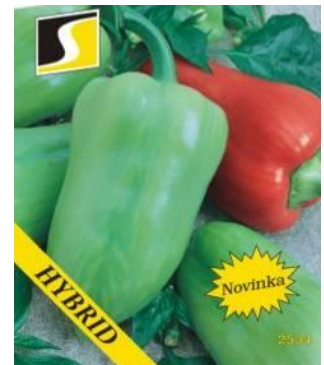
- Hybrid, not that better than “AMY”

“SLÁVY F1”

- More expensive seeds - hybrid – fruit is green in technical maturation, red in botanical

“LYDIA”

- Long fruits in green and red state
- Varieties for intensive field growing (drip irrigation, mulching)



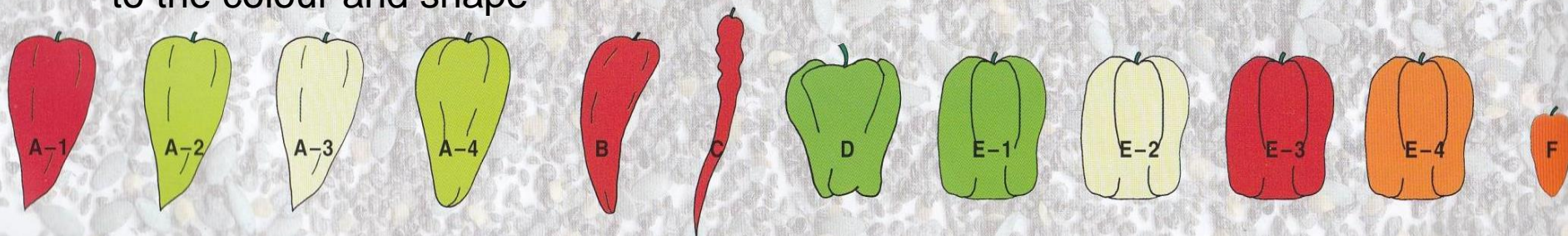
“SAMARA”

- Sweet pepper, “kozi roh” – long fruits
- Pickles into sweet and sour pickle with oil, just cut off the peduncle
 - For leisure gardeners
- Fruits are small, weight up to 1 kg



| Odrůda | Ranost | Vzrůst | Plod | | | | | Doporučujeme sklízet | | Doporučený způsob pěstování | | |
|--------------------------|------------|---------|----------------------------|----------------------------|------|------------|--------------|----------------------|----------------------|-----------------------------|-----------|---------|
| | | | barva v technické zralosti | barva v botanické zralosti | tvar | stěna (mm) | hmotnost (g) | v technické zralosti | v botanické zralosti | způsob pěstování | | |
| | | | | | | | | | | pole | fóliovník | skleník |
| HYBRIDNÍ odrůdy | | | | | | | | | | | | |
| LUNGY F1 | velmi raná | vysoký | zelená | tmavě červená | A-1 | 4 | 100 - 120 | + | ++ | ++ | ++ | + |
| SLÁVY F1 | velmi raná | vysoký | světle zelená | červená | A-2 | 5 | 100 - 110 | ++ | + | ++ | ++ | + |
| SLOVANA F1 (SM 23/04) NI | velmi raná | vysoký | světle zelená | červená | A-4 | 6 | 120 - 140 | ++ | + | ++ | ++ | + |
| SASKIA F1 (SM 42/04) NI | raná | střední | hráškově zelená | červená | E-1 | 6 | 120 - 140 | ++ | + | ++ | ++ | ++ |
| KVADRY F1 | raná | střední | krémově bílá | světle červená | D | 6 | 110-130 | ++ | - | ++ | ++ | ++ |
| GELBY F1 | poloraná | střední | krémově bílá | žlutá | E-2 | 5 | 100 - 110 | ++ | + | + | ++ | ++ |
| RUBIKA F1 | poloraná | střední | tmavě zelená | tmavě červená | E-3 | 6 | 120 - 140 | + | ++ | + | ++ | ++ |
| ORENY F1 | poloraná | nízký | tmavě zelená | oranžová | E-4 | 6 | 110 - 130 | + | ++ | - | ++ | ++ |
| NEHYBRIDNÍ odrůdy | | | | | | | | | | | | |
| AMY | raná | nízký | krémově bílá | světle červená | A-3 | 5 | 90 - 100 | ++ | - | ++ | + | - |
| LYDIA | raná | vysoký | zelená | tmavě červená | B | 3-4 | 70 - 80 | - | ++ | ++ | + | - |
| SAMARA | raná | střední | tmavě zelená | tmavě červená | C | 3 | 30 - 35 | + | ++ | ++ | + | + |
| HAMÍK | polopozdní | střední | tmavě zelená | oranžová | F | 3 | 30 - 40 | - | ++ | + | ++ | ++ |

Whole range of bell peppers from “SEMO Smržice” - not better than AMY varieties, grown substantially less, adequate varieties may be found according to the colour and shape





Slávy F1

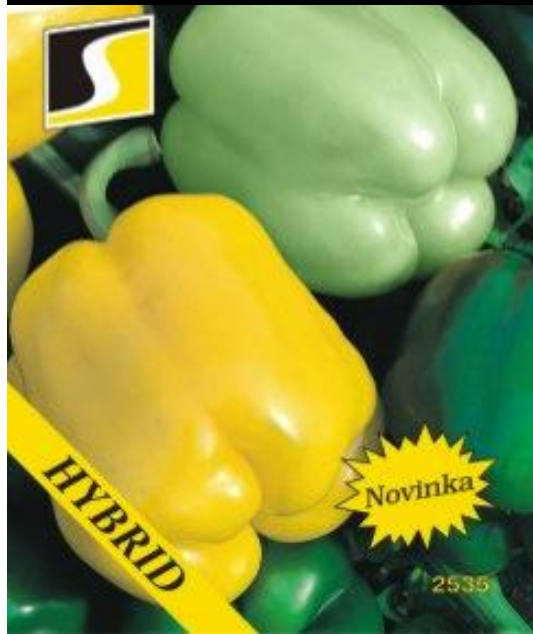


Oreny F1

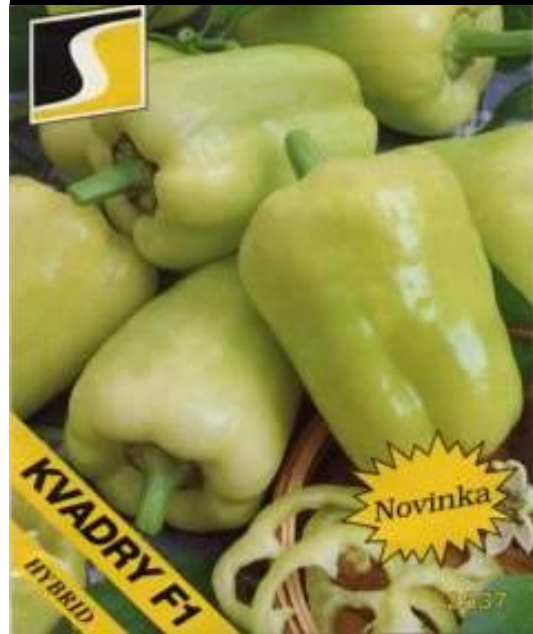


Rubika F1

'GELBY F1'



'KVADRY F1'



'LUNGY F1'



Chilli peppers – no demand in market nowadays
“PÁLIVEC”

- Popular in the past
- Not grown in mass-production
- Hot “lečo” dishes

“SIMONA”



Chilli peppers for spices
“KARKULKA”, “HODONÍNSKÁ SLADKÁ”

- Sweet spicy chilli peppers
- Distinctly coloured after drying
- Not grown in CR



Hodonínská sladká

- Eggplant (aubergine) - *Solanum melongena* L.
- Origin
 - Far East
 - Colour of fruit is white, yellow and purple
 - Prone to Colorado potato beetle
 - Only most early varieties are grown in CR – in plastic greenhouses or in greenhouses
- Significance



- Nutritional values
- Dry matter 6.5%
- Carbohydrates 8.0%
- Proteins 1.3%
- Fats 0.3%
- High content of pectin – reduces blood pressure
- - Binds heavy metals
- - Reduces levels of harmful cholesterol



Dietary minerals

Higher content of P than tomatoes and bell peppers

C 50

Provitamin A 0.3

B6 0.8

E 0.3

PP 5.0

Vitamins (mg.1,000 g-1)





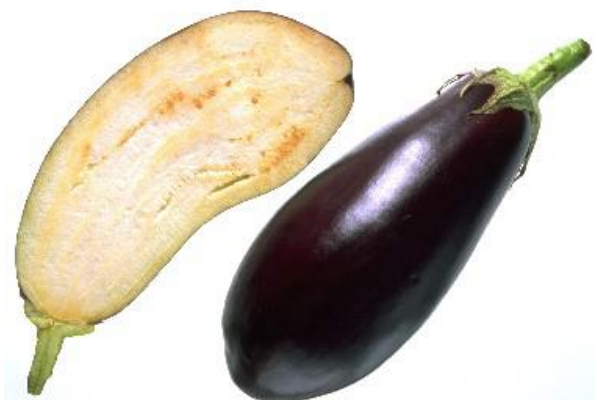
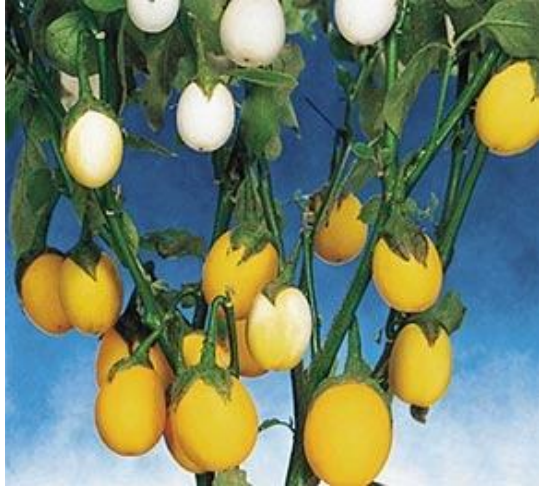
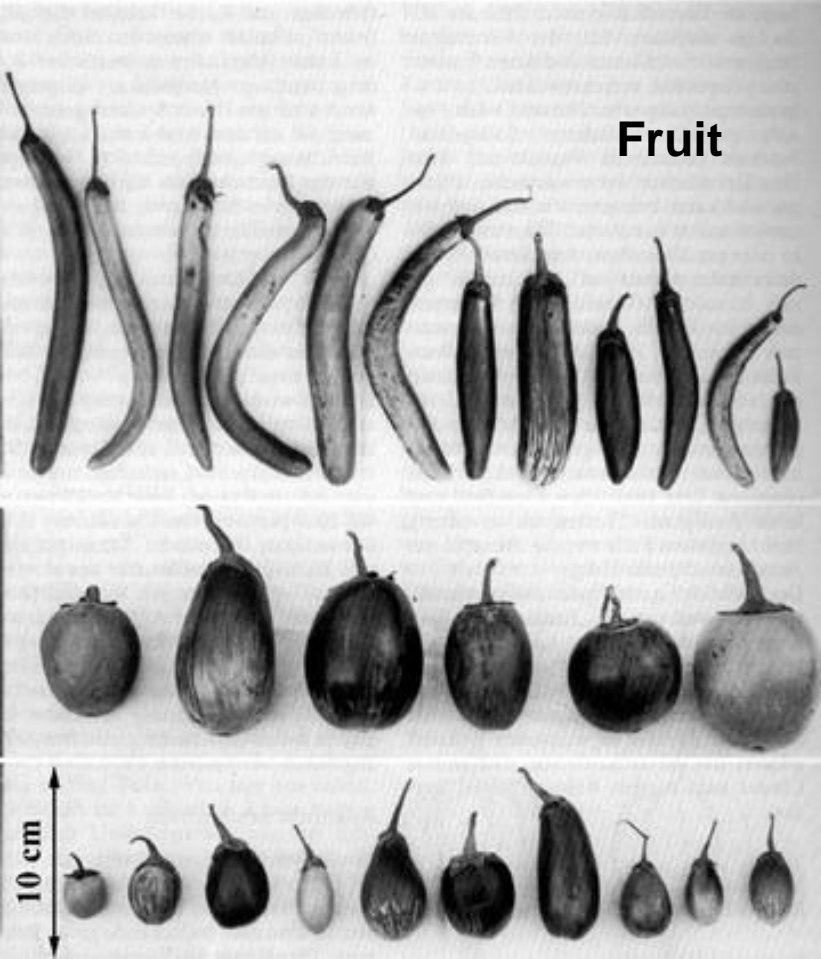
Leaf



Bloom



Fruit



- “ČESKÝ RANÝ”
- “KRASAN”
- • New variety
- • Matures about 5 days later



- Cucumber - *Cucumis sativus* L.
- Origin
 - India
 - One of the oldest culture plants
 - In Europe: in the 5th century BC



Gherkins

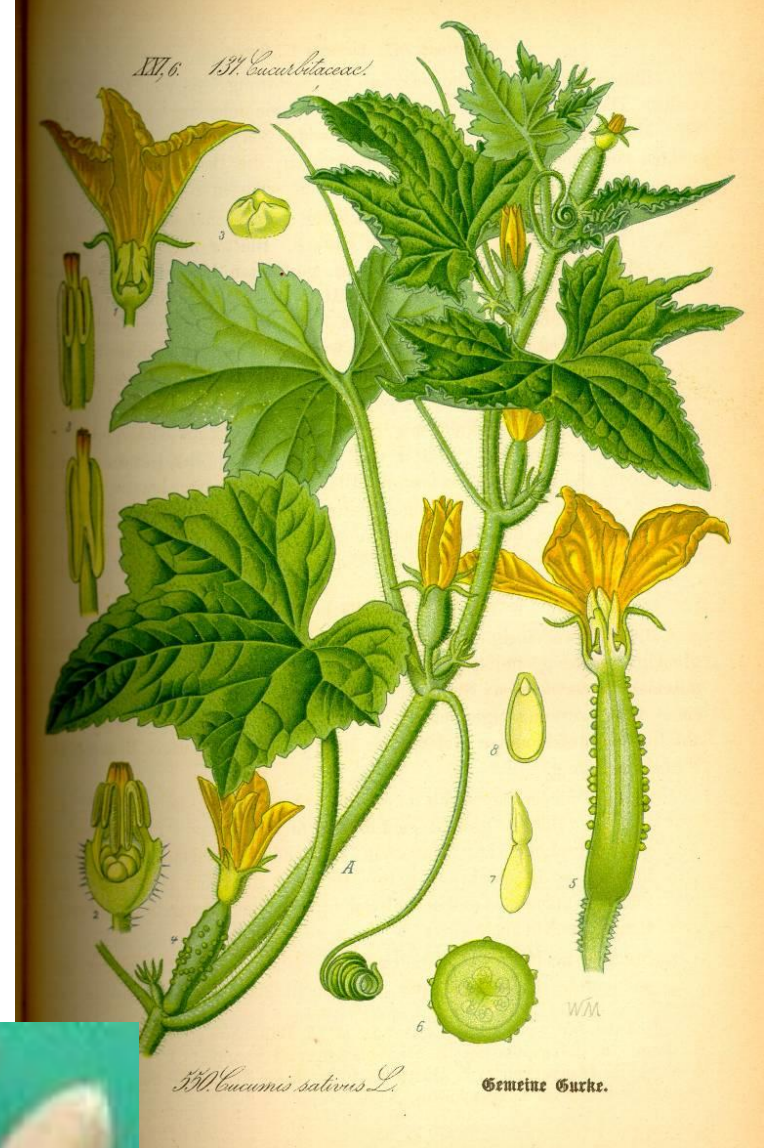
- Canning industry
- Western Europe: trend to limit consumption of vegetables pickled in vinegar
- Areas for growing gherkins decreased to 1/3-1/2 in Netherlands
- Production of gherkins slightly rises in CR
- Gherkins were not pickled in vinegar till the end of World War II - only lactic fermentation – at a certain stage, fermentation is stopped and gherkins are sterilized - 100% healthy
- Vinegar is a preservative agent – higher concentration of vinegar etches the walls of the stomach and intestines!

Cucumbers

- Preparation of salads, frozen food processing

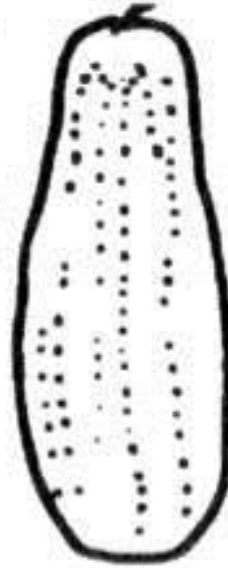
Cucumbers vs. gherkins

- In Europe:
 - 2/3 cucumbers
 - 1/3 gherkins
- In CR:
 - 20% cucumbers
 - 80% gherkins





řídce bradavičnatý

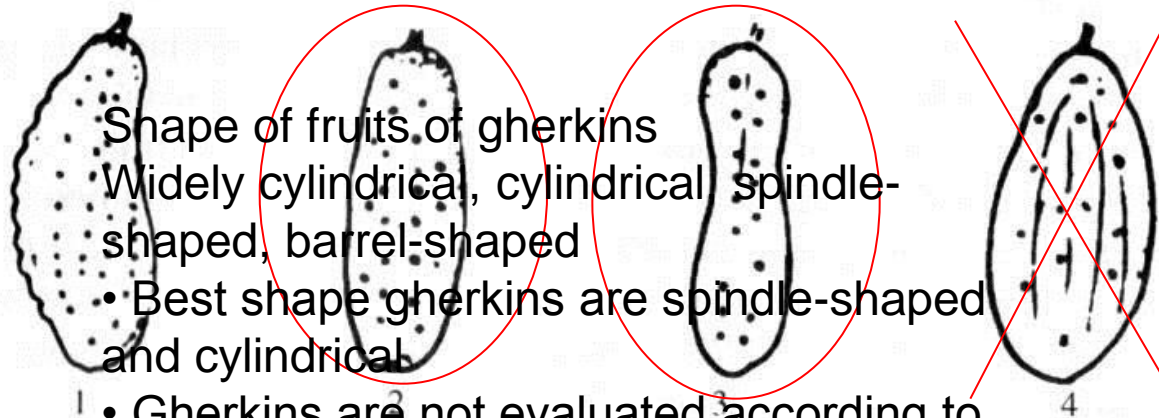


hustě jemně
bradavičnatý



hustě hrubě
bradavičnatý

Surface of fruits of gherkins
Sparsely spiny, densely and gently spiny,
densely and roughly spiny
Harvest is less pleasant; higher quality;
crunching pulp



Shape of fruits of gherkins

Widely cylindrical, cylindrical spindle-shaped, barrel-shaped

• Best shape gherkins are spindle-shaped and cylindrical

- Gherkins are not evaluated according to the length, but according to thickness of fruits in the middle:
 - A up to 2.5cm 12 CZK/kg
 - E above 5cm 0.90 CZK/kg
 - Collector receives 3- 5CZK per 1 kg of collected fruits

Field cucumbers

- Usually non-parthenocarpic cucumbers
 - Require pollination
 - Develop seeds
 - Higher yield
 - Everybody can produce seeds
-
- For growing in field conditions and in plastic greenhouses
 - Czech varieties – good quality
 - Need to grow hybrid varieties!

“MARKYZA F1”

- Early cucumber
- High balance of fruits
- Cylindrical fruit of dark green colour
- Length of fruit is 18 to 22cm
- Tolerant to downy mildew of cucumber and powdery mildew of cucumber
- Thanks to earliness of this variety, plants may be grown from late plantings



“LILI F1”

- Early cucumber
- Stable, high crop yields below foil and in field conditions
- Dark green, slim fruits, 23cm long, sparsely spiny
- Good storability
- High field resistance to downy mildew of cucumber (18 days)
- Tolerant to powdery mildew of cucumber
- Powdery mildew infest cucumber in second half of August, at that time the plants are already mature



“CHEER F1”

- Very radical onset of harvest:
- Appropriate for early harvests
- Grown to be harvested in autumn
- Fruit does not overgrow, length: 20-22cm
- Dark green colour with significant shine
- Very firm peel – resistant to pests
- Occurrence of deformed fruits is minimal
- Prone to moulds



'LIVIE'



“LIVIE F1” – tolerant to moulds

“LINDA F1” – tolerant to downy mildew of cucumber

“PERSEUS F1” – prone to moulds



'LINDA'



“OBELIX F1”

- Semi-early hybrid variety with predominantly female blooming
- Appropriate for growing on fields
- Tolerates even temporarily colder conditions during vegetation
- Fruits are dark green, cylindrical with sparse spines of 20-22cm length
- High tolerance to downy mildew
- Fruits are genetically non-bitter



DO NOT GROW:

“STELA”

- Field cucumber of 1975
- Non-hybrid
- Dimensionally unsuitable
- Thick peel
- Without tolerance to mould

Greenhouse cucumbers

- Appropriate for growing in greenhouses and plastic greenhouses
 - Growing is limited (in Tvrdonice – 2 ha)
 - Usually parthenocarpic:
 - Fruit develops without pollination – have no seeds
 - Softer pulp
 - Does not need pollination (undesirable)
 - Advantage in closed premises
 - Plant has usually only female blooms
 - Seedlings are expensive – price is per piece of seed
 - We cannot produce seeds – necessary to buy original seeds
-
- Yield is lower - per 1m² of greenhouse
 - Yield of parthenocarpic is 30kg
 - Yield of non-parthenocarpic is 50kg



Short and medium long cucumbers
“MINISPRINT F1”

- “UNI” is excellent:
- Intended for greenhouses and plastic greenhouses; can be also successfully grown outdoors
- Rapid onset of fertility
- Medium green fruits
- Length: 15-17cm
- Thin peel, excellent taste
- Uniform fruits



“BABY F1”

- Very early hybrid variety, very profitable
- Appropriate for year round growing in greenhouses, plastic greenhouses and plastic tunnels
- Balanced fruit, length: 15-17 cm, colour is medium- to dark green
- Firm peel - therefore they are short-term storable
- Appropriate for production of delicatessen mini-cucumbers – cucumber 10cm long – must be harvested at least every other day

