



The effectiveness of year-round production tomatoes and cucumbers in Poland

Tomasz Krasowski
Delphy Poland



Worldwide Expertise for Food & Flowers

Poland:

Population 38,5 million inhabitants (MDA: 3,5 millions)

Acreage: 312 000 km² (MDA 33 800 km²)

1,9 million (15%) people working in agriculture sector

Total: 1,4 million farms (>1ha)

Average size of the farm: 10,5ha

The biggest farm: 15 000ha

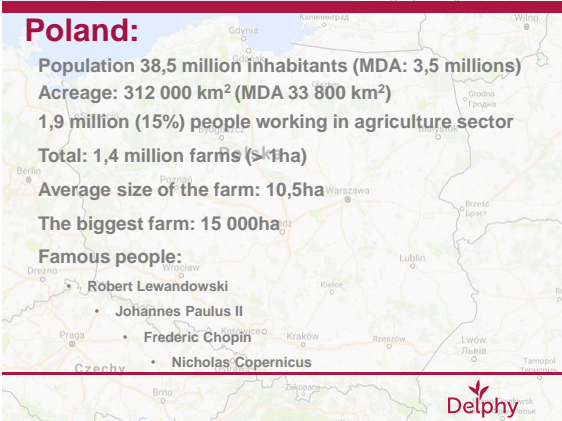
Famous people:

• Robert Lewandowski

• Johannes Paulus II

• Frederic Chopin

• Nicholas Copernicus



	Poland
Tomato AGH	1200 ha
Cucumber AGH	250 ha
Average size of tomato GH	2,5 ha
Local market/export %	Big/10-20%
Grower selling groups (% of growers)	5
climate	more continental
technological advancement of tomato GH production (scale: 1-10)	5-6
Operation labour cost	5 C/h
Energy (cost €/m ²)	coal (5,5C/m ²)
CO ₂ usage (kg/m ² /year)	5-10
Max tomato yield (traditional crop without light)	65 kg/m ²



Tomato selling channel

- **Supermarkets: around 60-65% of tomatoes**
 - Discounts: Biedronka, Lidl, Netto, Aldi, Dino.
 - Supermarkets: Tesco, Auchan, Kaufland, Carrefour
- **Local auktions: 20- 25%**
 - Warszawa, Poznan, Wrocław, Katowice, Kraków, Lublin, Gdańsk.
 - Supplies small groceries
- **Export: 10-20% of total production**
 - East: 30-40% Ukraine, Belarus, Baltic States.
From 2014 Embargo to Russia
 - West 30-40%: UK, France, Germany, Scandinavia
 - Other 10- 20%: Czech republic, Balcan countries, Grece



Export:

- ✓ After ban to Russia in 2014 export decreased, almost no export at this moment
- ✓ After Russia ban in August 2014 export moved to another countries, also to west EU
- ✓ Earlier, Polish tomatoes succeed in Russia, because of good quality and shorter distance than from NL
- ✓ Last years quality of bulk tomatoes increased, and it is more and more competitive to Dutch tomatoes
- ✓ When the ban will be over (when???), it can be only better...



Most popular varieties:



- Tomimaru Mucho (pink, De Ruiter)
- Torero (beef, De Ruiter)
- Barteza (beef, De Ruiter)
- Edamso (beef, Syngenta)
- Admiro (small beef, De Ruiter)
- Merlice, (TOV, De Ruiter)
- Endavour (TOV Rijk Zwaan)
- Belido (coctail, Syngenta)
- Prunus (plum, De Ruiter)



- Pacto (20-25cm, DeRuiter)
- Media (20-25cm, Rijk Zwaan)
- Melen (20cm, Enza Zaden)
- Mirabelle (10cm, De Ruiter)



Substrates:

Rockwool:

- Grotop master
 - Cultilene exact air
 - Cultilene excellent
 - Grotop expert
 - Cultilene maxima
- more popular slabs 10cm high



Coco peat:

- Forteco
- Ceres



7



Technical equipment of modern greenhouse:

- Height: 5,5-6m high
- buffer tank (100-300m³/ha)
- Heating medium: 95% black coal → usage: 500-800t/ha/year
- Single/double shading screens, e.g. Svenson Luxos 1347, Bonar
- double (triple) spiral growing pipe 32mm
- gutters 1,6m; sometimes 2,00m
- Liquid CO₂ installation
- drippers: 2 - 2,2 - 3,0l/h; capacity: 1,3 - 1,5l/h/m²
- normal, hard glass.
- more popular diffuse (haze factor: 25-40), low Fe, antireflex glass

8



Climate, irrigation strategy

Climate computers:

- Priva
- Sercom
- Hortimax
- Hoogendoorn



Fertigation:

- single macro N,P,K,Mg,Ca fertilizers
- Single or mixed micronutrients

9





10

Delphy

Single or double screen:



11

Delphy

Walczak Pipes



Delphy

Walczak Pipes:



- Bigger heat exchange surface
- 50% less water
- more efficient = energy savings up to 20-30%
- More popular in polish greenhouses

13



Walczak Pipes



Black coal boilers:



15





Buffer tank
CO2 liquid tank

16





Ventilators:

17





Irrigation unit:

18



water purification system



19



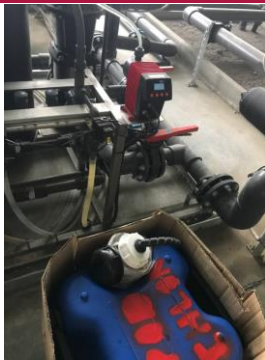
Water tank with preacidification system:



20



NaClO or H₂O₂ dosage unit:



21



Modern sprayer machine:



22



Technology:

- Planting date: 15 December - 30 January
- Young plants: 70% grafted 1:2, sometimes 1:1
- YPR around 80%
 - Krasoń
 - Mularski
 - Dutch YPR: vd Lugt, Fortaplant, Grow Group, Amerlaan
- Harvest period:
 - start: end of March
 - End: end of November
- Start density: 2,5 plants/m²
- Final density: 2,5→3,2 pl/m²
- Liquid CO₂ usage: 50-150 t/ha/year



23



Cucumber:

- Umbrella system: 90%
- High wire system: 10%
- 2 crops/year:
 - First crop: I-VI
 - Second crop: VII-IX
- Often cucumber as 1st crop and tomato as 2nd crop in autumn (8-11 clusters)



24



Labour mamangement

- 5-10 workers per 1ha tomato/cucumber crop
- Salary: 450-550 €/ month
- Lack of physical people
- 60% workers from Ukraine



25



Crop protection

- Bumble bees pollination: 100%
- Tomato: 70% bio control
 - White fly → Macrolophus, Encarsia
 - Spider mite → selective insecticides
 - Botrytis → climate, irrigation strategy
 - Crazy roots: new problem from 2018
- Cucumber: 30% bio control
 - Spider mite, Trips → Amblyseius californicus, Swirski
 - White fly: Encarsia
 - Powder mildew: fungicide, sulphur
- Higene protocol: overals, shoes, gloves

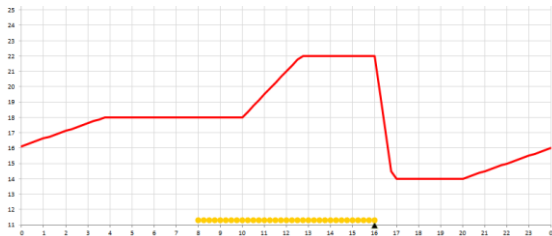


26



How much light does a crop need? Young, not flowering plant

18°C 24 hour, example situation January



27





31

Delphy

Artificial light tomato crops:



- 40ha tomatoes → pink- Tomimaru Mucho
- HPS lamps: 4 x 1000 W at 8 m bay.
 at 4,5 m post distance→ 210 $\mu\text{mol}/\text{m}^2.\text{s}$ (16.000 lux)
 at 5,0 m post distance→ 189 $\mu\text{mol}/\text{m}^2.\text{s}$ (14.500 lux)
- Planting date: September, October: 2,5 plants/m²
- Lamps switch on around 2500 h/year
- Yield: Tomimaru: 45-50kg/m². In winter: 1,0-1,2kg/m²/week

Tomimaru: difficult to grow: leaf scorch, BER, green/yellow shoulder

32

Delphy



Market trends:

- Consolidation: bigger farms expanding, small growers stop
- Investment in new greenhouse technology
- Replacing old with new modern GH.
- Standart at this moment: 6m high, 2 screens, spiral growing pipe, buffer tank, sometimes diffuse/antireflex glass
- Early planting: December-January is standard planting date.
- Quality is more and more important
- Surface increasing: 2018 → + 20ha.
- Artificial light slowly increasing: tomato 45ha
- Groups of growers: usually family groups.
- Piak tomato- more and more popular: 2019: 500ha
- Slowly, but more and more specialities





QUESTIONS?



Worldwide Expertise for Food & Flowers



Thank you for your attention!



Worldwide Expertise for Food & Flowers
