



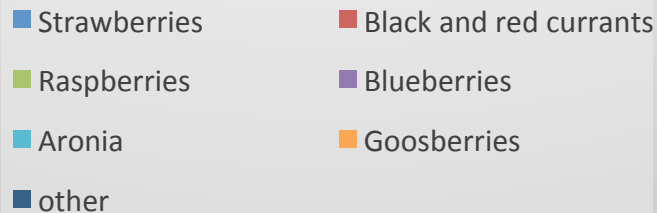
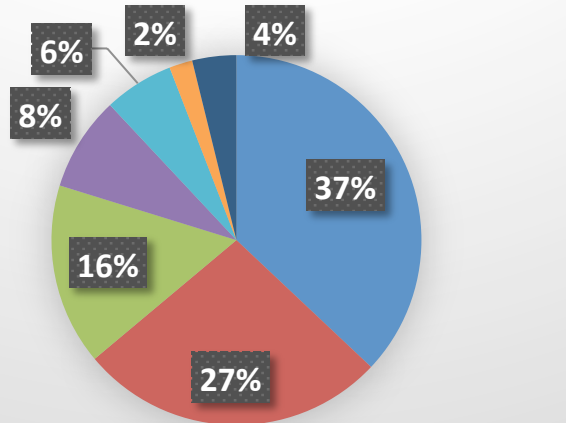
# Raspberry and blueberry sector in Poland

---

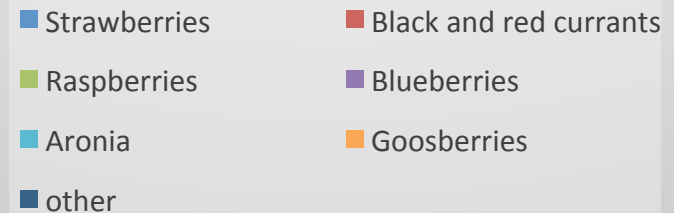
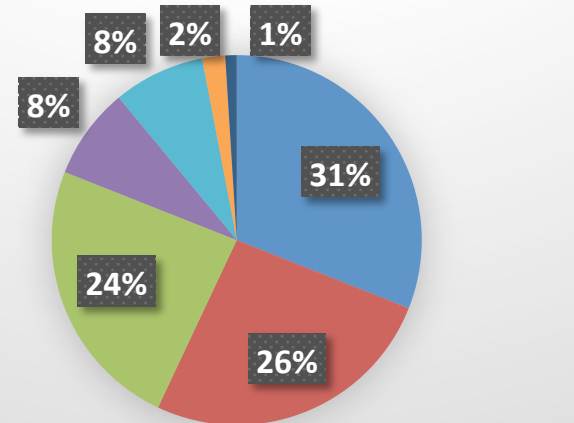
*dr Paweł Krawiec, Horti Team, Lublin, Poland*

## Polish berry production (%)

**Production in 2019:**  
**472 600 tons (-20% to 2018)**

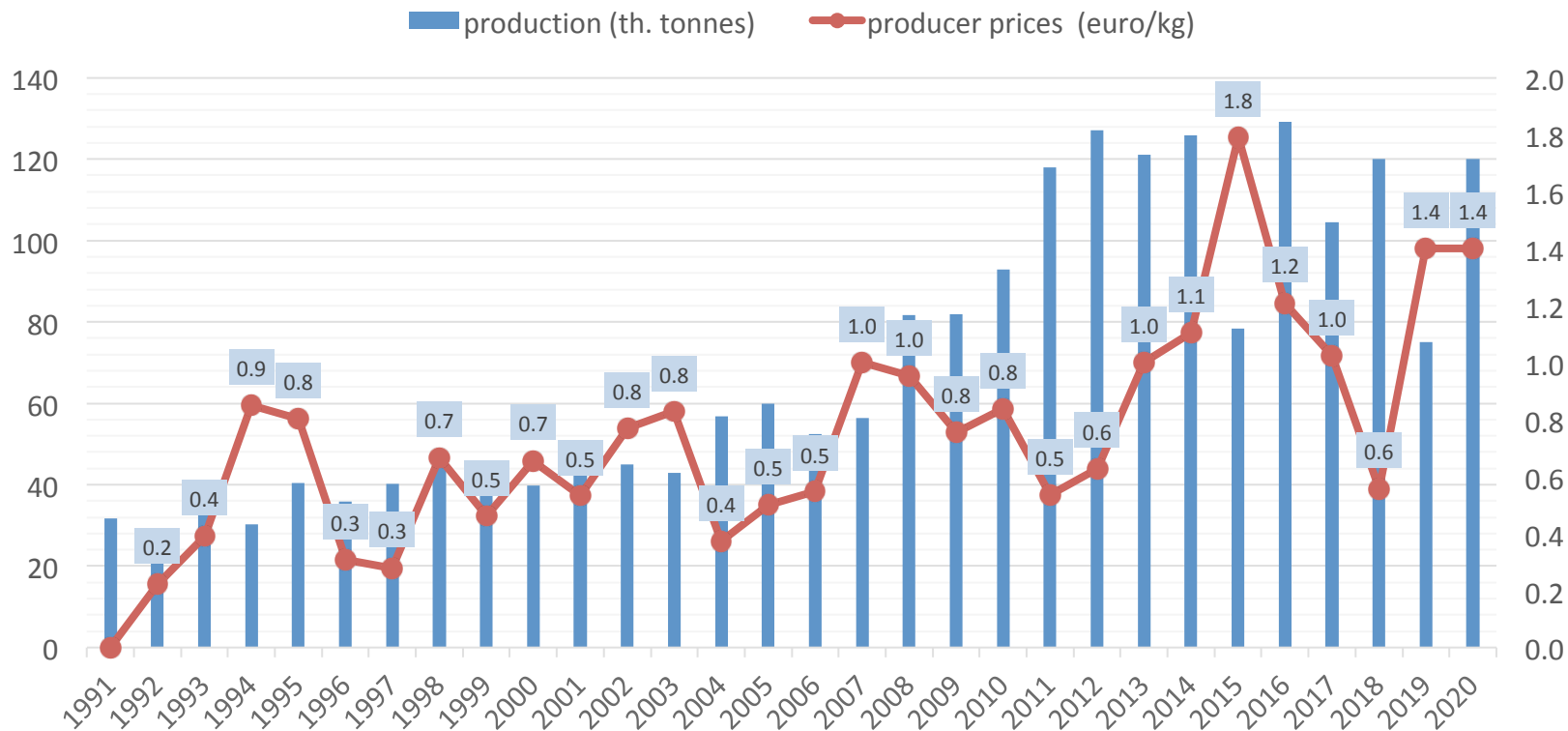


**Production in 2020:**  
**508 000 tons (+10% to 2019)**





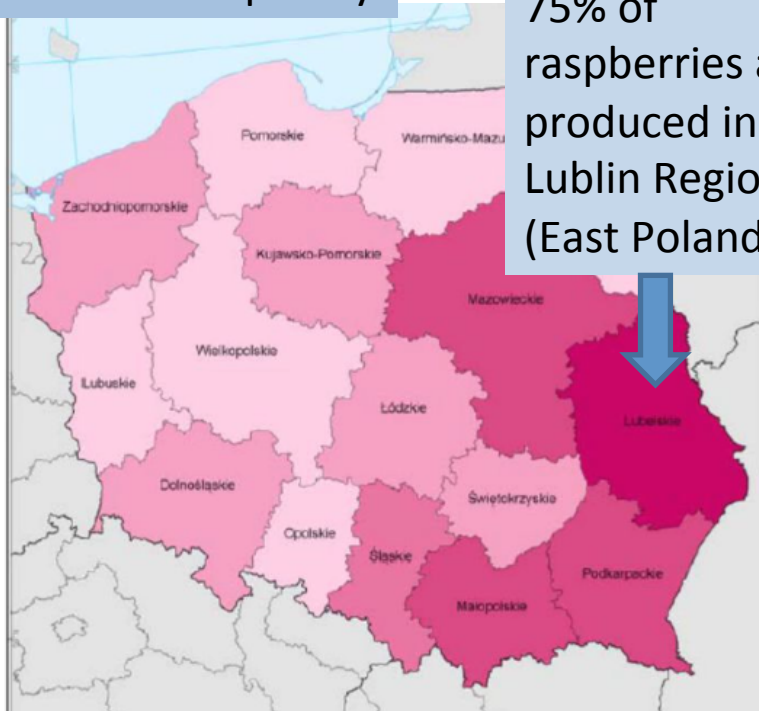
# Production and prices of raspberries in Poland



# Raspberry production in Poland – main regions

30 000 ha of raspberry

75% of raspberries are produced in Lublin Region (East Poland)



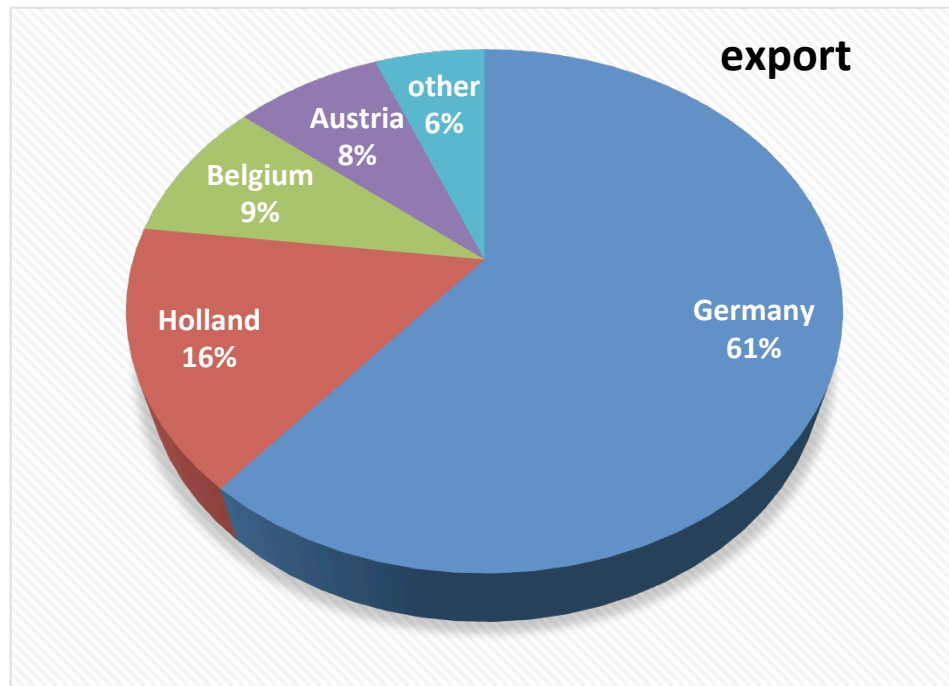
The raspberry success in 1974 in this part decided by several factors:

- perfect climatic and soil conditions for raspberry,
- poorly developed industry
- low income of farmers,
- small farms,
- many workers

Number of farmers	72 000
Area < 1ha	50%
Area 1-2ha	20%
Area > 2ha	30%

# Berry processing industry in Poland and export

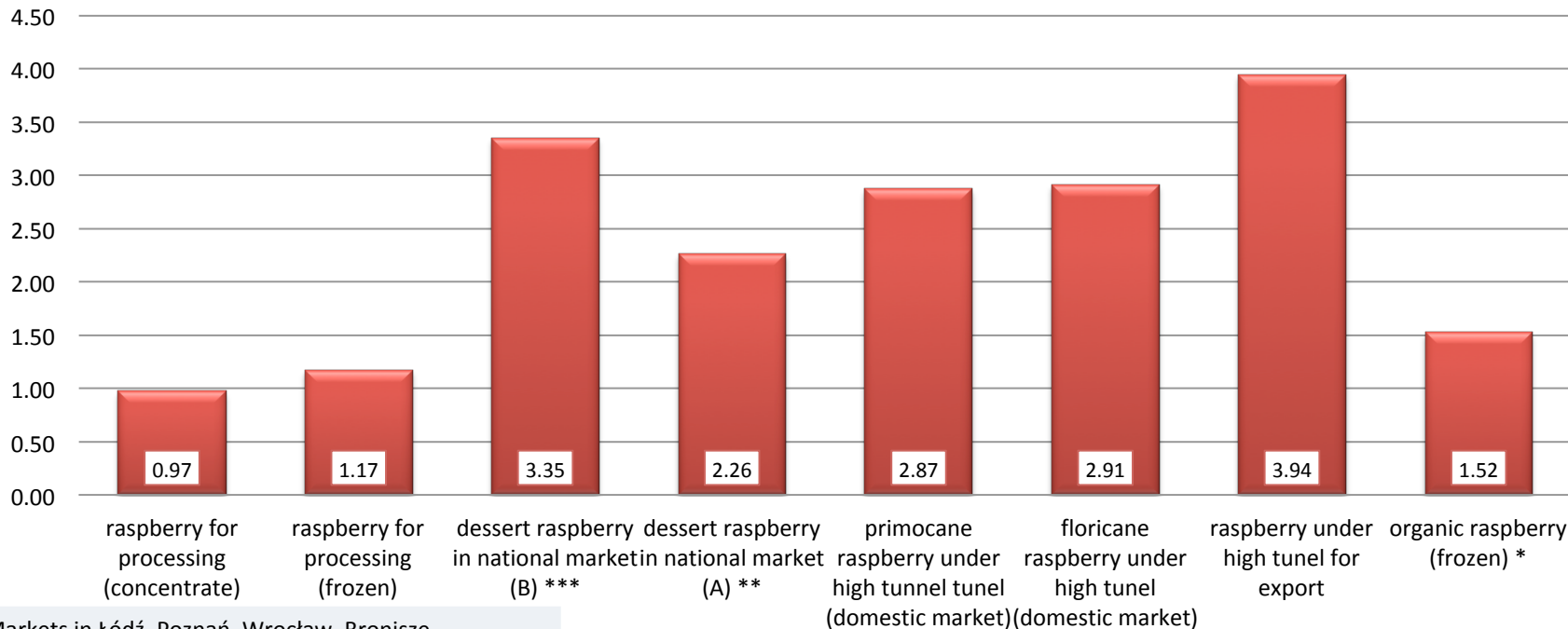
Type of production	Number of processors
Production of juices, concentrate	50
Production of frozen fruit and vegetables	300



# Production costs for primocane raspberries for processing in euro/hectare, yield 8 tons

	Small farm (<1ha)	Large farm (>1ha)
Materials	767	767
Packaging	512	512
Contract work	1837	3651
Self-employment		535
Cost of machinery operation	163	372
Professionals seivces	93	93
Depreciation of plantations		279
<b>Total direct costs</b>	<b>3279</b>	<b>6140</b>
Indirect costs	419	791
<b>Total economic costs</b>	<b>3698</b>	<b>6930</b>
Property costs		1279
<b>Total costs</b>		<b>8209</b>
Unit costs (euro/kg)	0,47	1,02
Income in euro/ha	5233	1209

# The average producer sales prices in euro/kg (2014-2018)



\*\* - Markets in Łódź, Poznań, Wrocław, Bronisze

\*\*\* - Markets in Lublin, Sandomierz, Rzeszów, (Bronisze 2018)

Source: own studies



# Challenges for polish raspberry sector:

1. Labour!!!

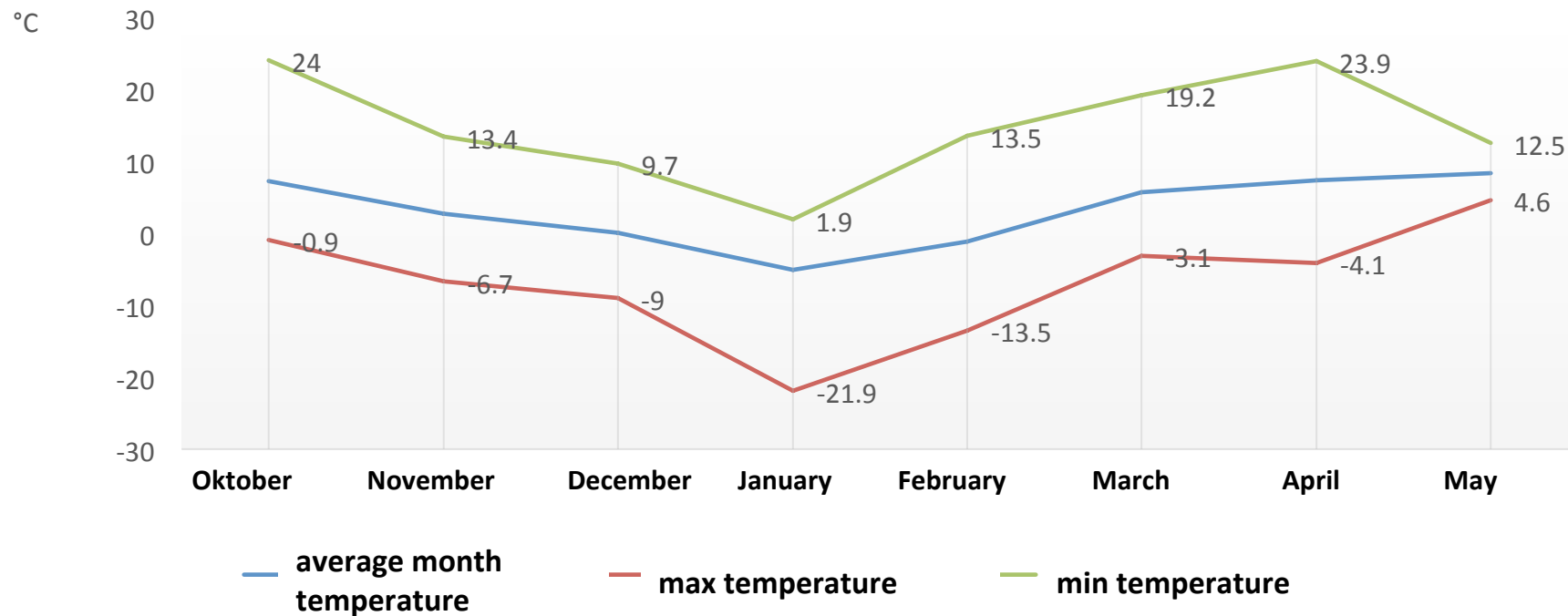
2. Climate

3. Good variety (fresh market or processing)

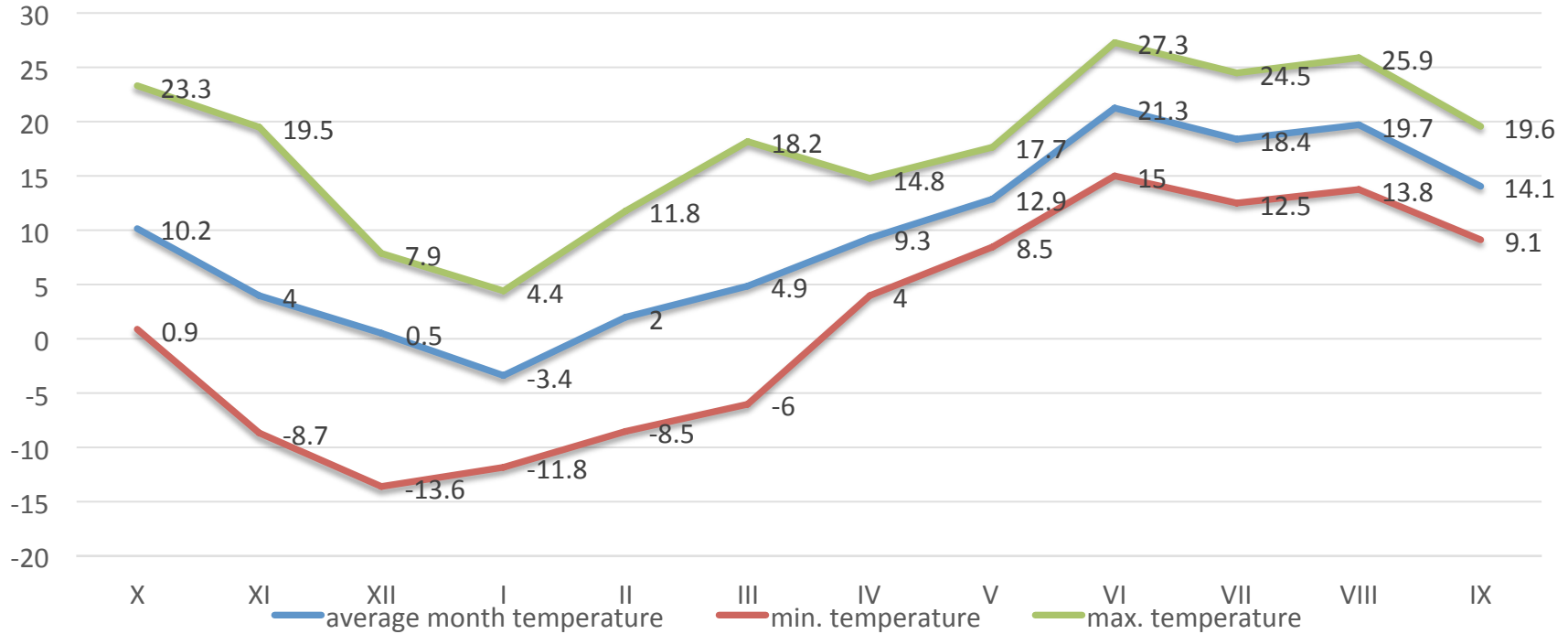
4. High health of planting material



# Poland – the end of 2016 and winter 2016/2017 and spring 2017 – Raspberry Lublin Region



## Winter 2018/2019, spring and summer, 2019 – Lublin Region, Poland



# "Raspberry apocalypse" 2019

**Frost damages of roots after  
winter (2018/2019) without snow  
- unregular plant growth**



**Laszka  
11.07.2019**



**Polka  
11.07.2019**



# Frost damages after winter 2018/2019



**Frost damages at  
the base of  
blooming shoots**



Glen Ample 8.04.019



# Florican raspberry (industry)

Glen  
Ample



'Laszka'



'Willamette'



Malling  
Seedling

**Floricane raspberry  
(fresh market)**



**'Laszka'**

**Glen Ample**



**Glen Dee**



# The new floricanane varieties



**'Przehyba'**



**'Sokolica'**



**'Radziejowa'**



**Polka**

**Primocane raspberry**





**'Polana' 14.05.18r.**



**Polana**





**Poema  
t**



**Primocane raspberry**



**Polone  
z**



**'Kwanza'**

**Primocane raspberry**



**Enrosadira**



## Traditional



- not homogeneous plants
- risk of dried roots
- bed starting after planting
- very easy „illegal production” of some varieties
- high risk of viruses, insects, soil diseases

## Planting material

### Plug plants



# New type of raspberry plantation



## Advantages

- good quality,
- strong growth,
- very fast fruiting

## Plug plants



## Disadvantages

- good location,
- irrigation,
- possibility to buy – spring and summer

Spacing	Number of plants per 1 ha	Spacing	Number of plants per 1 ha	Spacing	Number of plants per 1 ha
3 x 0,25 m	13 300	3,5 x 0,25 m	11 400	4 x 0,25 m	10 000
3 x 0,4 m	8 300	3,5 x 0,4 m	7 142	4 x 0,4 m	6 250
3 x 0,5 m	6 666	3,5 x 0,5 m	5 700	4 x 0,5 m	5 000



## The new model of primecane raspberry plantation (2018), Poland



- raised beds
- mulching beds
- trellis system for managing the canes



- control of canes number
- easier control of diseases and insects
- lowest costs of harvest



## The influence of polypropylene mulching on yielding of Polana 2016 - 2018

	Yield 2016 (t/ha)	Yield 2017 (t/ ha)	Yield 2018 (t/ ha)
<b>control</b>	<b>1,65a</b>	<b>8,9</b>	<b>10,8</b>
<b>mulching</b>	<b>2,59b</b>	<b>10,4</b>	<b>11,7</b>



# The yielding of new model of primecane raspberry plantation in 2018, (date of planting, June 2017, plug plants)



**7.05.2018**



**21.08.2018**

Variety	Yield per ha (t)	Mass of 100 fruits (g)
'Polka'	11,3	343,9
'Poemat'	14,5	431,8
'Polonez'	16,9	392,4
'Enrosadira'	16,5	413,5
'Sugana'	15,7	483,1



## **Double crop – the raspberries from June to November**



- **high tunnels**
- **raised beds**
- **mulching**
- **control of cane number**
- **primecane varieties**

## New trends – raspberry in pots



- high tunnels
- raised mulching beds
- control of cane number
- primocane/floricane varieties
- pots 7 litres
- substrates



# Blueberry in Poland

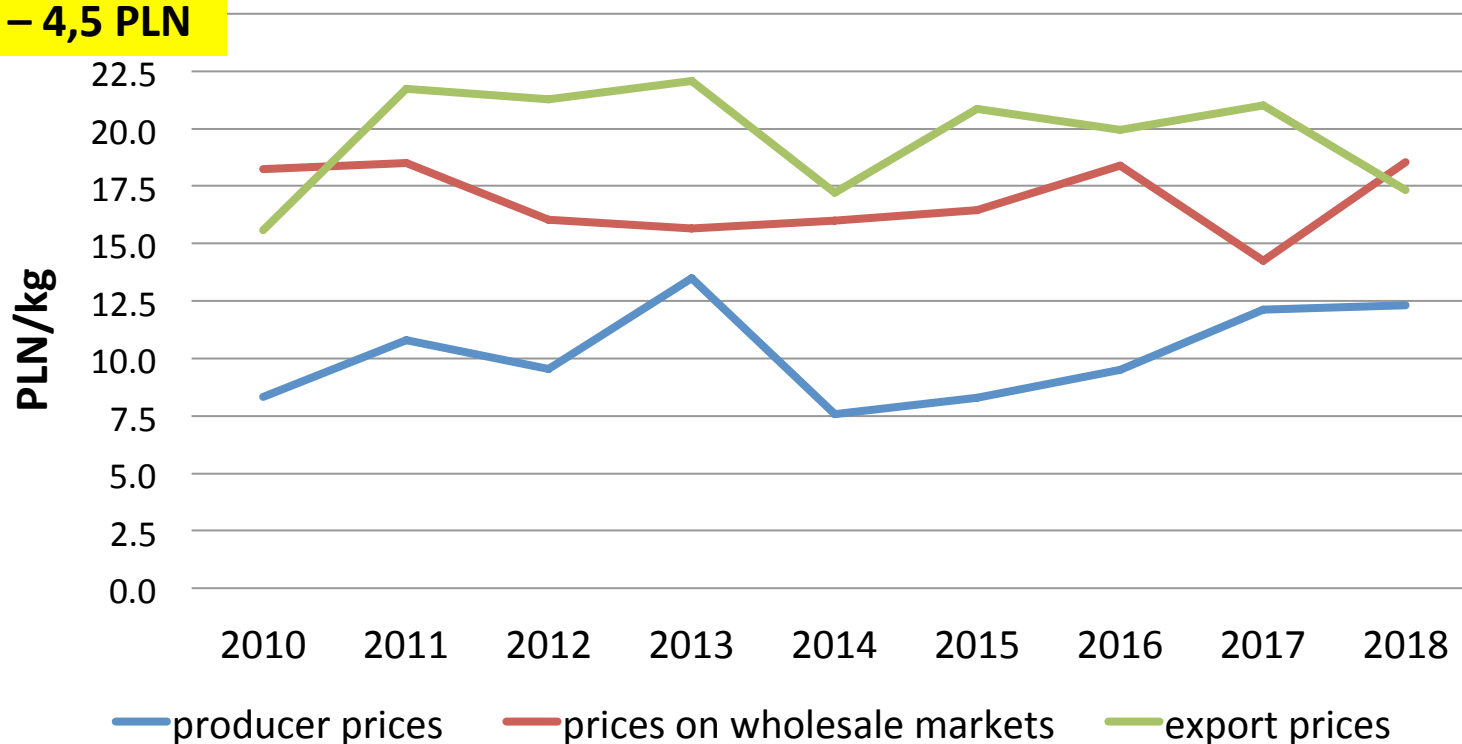




# Average annual selling prices of blueberries

(average over 8 years)

1 Euro – 4,5 PLN



Elaboration by Dr D. Paszko UP in Lublin, 2019

Source: study based on own research and Eurostat, IERiGŻ, MRiRW, AMI, Wapa, DG, AGRI, USDA, Prof. E. Makosz

# Blueberry selling prices (*seasonal differentiation*)

1 Euro – 4,5 PLN



Source: Own study based on MR&D

Elaboration by Dr D. Paszko UP in Lublin, 2019

# Calculation of the cost and income of a blueberry plantation, yield 10,00 tonnes/ha

	thousands of PLN/ha	PLN/kg
Revenue from the sale of blueberries	121,91	13,35
Total production costs	94,86	10,38
Clean income	27,04	2,97



**Crop systems**









# Container-growing of blueberry

---



# Tunnels - roofs









**Soil preparation –  
organic matter - sawdust +  
peat**

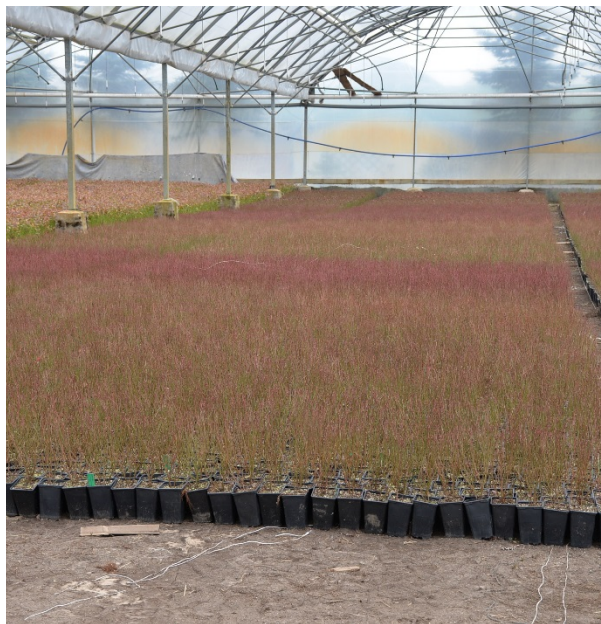




# Raised beds







# Planting

---

# Variety

<b>Early varieties</b>	<b>‘Earliblue’, ‘Duke’, ‘Sunrise’, ‘Spartan’, ‘Bluetta’</b>	<b>‘Draper’</b>
<b>Medium-late varieties</b>	<b>‘Patriot’, ‘Bluejay’, ‘Blueray’, ‘Bluecrop’,</b>	<b>‘Top Shelf’, ‘Blue Ribbon’</b>
<b>Medium varieties</b>	<b>‘Berkeley’, ‘Chandler’, ‘Toro’, ‘Bonifacy’</b>	<b>‘Valor’, ‘Calypso’</b>
<b>Medium-late varieties</b>	<b>‘Brigitta’, ‘Nelson’, ‘Rubel’, ‘Legacy’, ‘Bluegold’, ‘Toro’</b>	<b>‘Cargo’</b>
<b>Late varieties</b>	<b>‘Darrow’, ‘Elliott’, ‘Lateblue’</b>	<b>‘Liberty’, ‘Last Call’, ‘Aurora’</b>



# Planting





# Cutting after planting





# Row mulching



The thickness of the mulch layer should be at least 10-12





# Synthetic mulching





# Synthetic mulching





# Herbicides - glyphosate!!!!!!!!!!!!!! - Are you sure it is worth the risk?

glyfosat



no glyfosat





**Grey mold (*Botrytis cinereis*)**

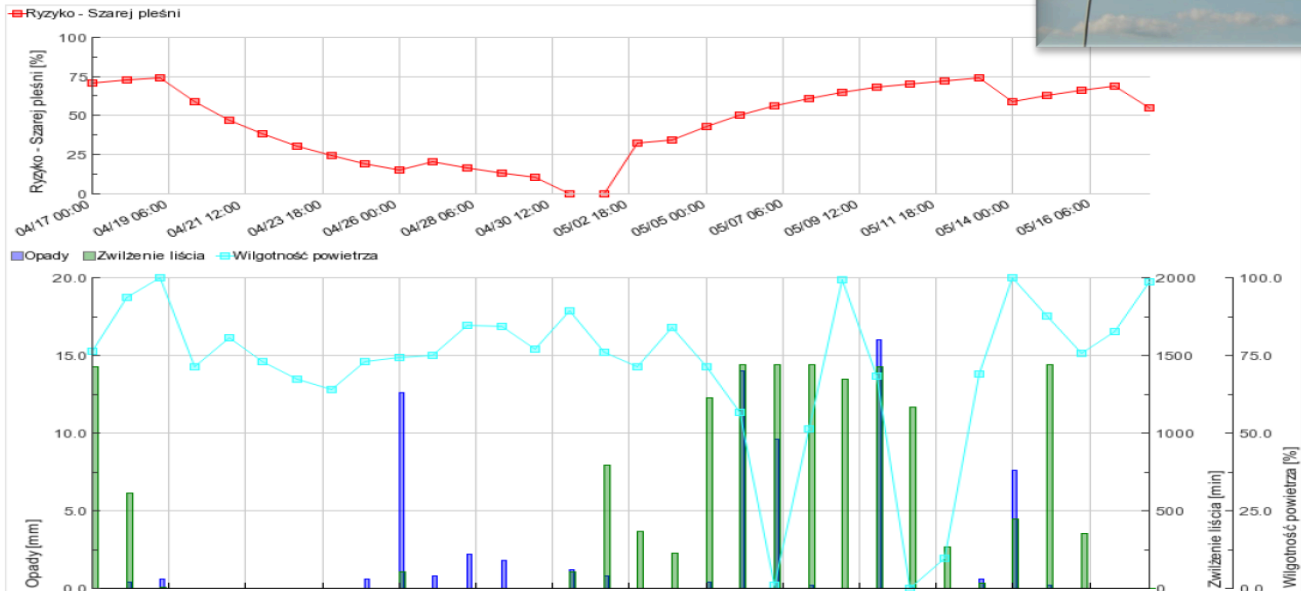
---



# iMetos disease model for the risk of *B. cinerea* infection



Station name	Start date/time	End date/time	Altitude	Longitude	Latitude
Karczmiska - Krawiec	2015-04-17 00:00	2015-05-18 00:00		22.00431	51.24032



Sensor name (Channel)	Min	Max	Notes
Opady (Ch. 5)	0.0	16.0	
Zwilżenie liścia (Ch. 8)	0	1440	
Wilgotność powietrza (Ch. 23)	0.0	100.0	
Ryzyko - Szarej pleśni (Ch. 19402)	0	74	

# Anthracnose (*Colletotrichum acutatum*)



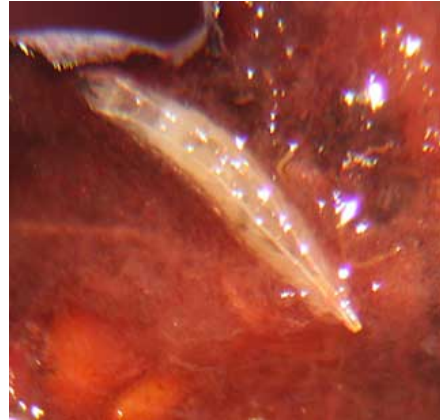
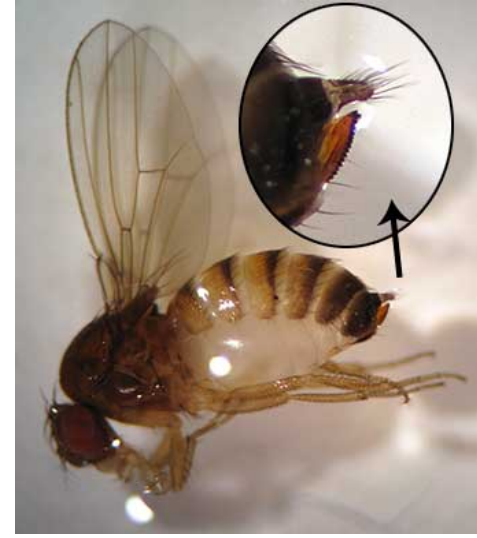




# Blueberry tip midge

---

# *Drosophila suzukii*







Pollination management



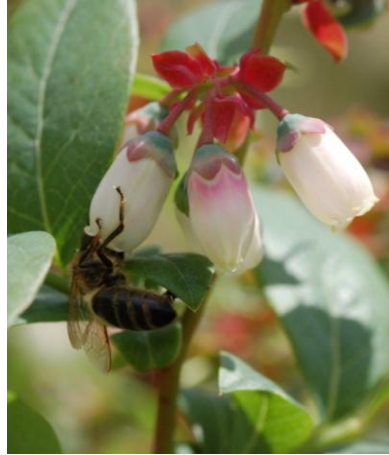
# Main pollinators in blueberry

**Bumblebees**



**70%**

**Honeybee**



**25%**

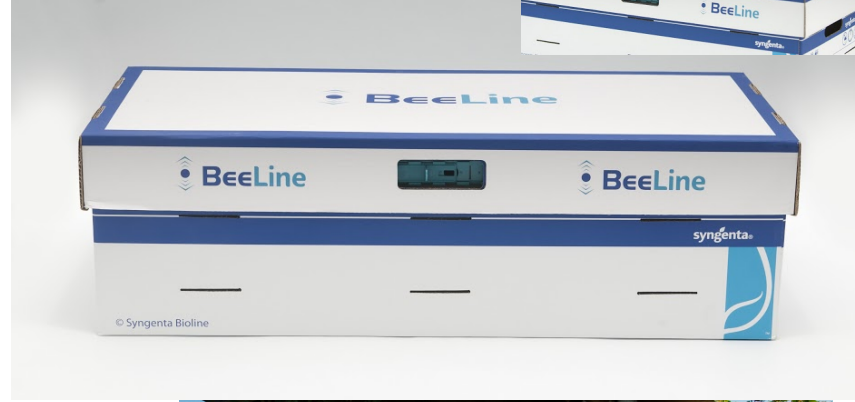
**Wild bee**



**5%**

(source: Giejdasz 2008)





# GLOBALG.A.P.



## Certyfikat

Standard odniesienia

**GLOBALG.A.P.**

Na zgodność z GLOBALG.A.P.®  
Przepisy Ogólne Wersja 5.1\_Lipiec2017

Numer rejestracyjny

TUV-PL068

GGN

4050373180348

Numer certyfikatu

0198 734 00047



Opcja 1

Producent indywidualny

Posiadacz certyfikatu:

**Paweł Krawiec**

ul. Józefowska 35

24-300 Opole Lubelskie

Kraj produkcji:

Polska

Aneks zawiera szczegółowe informacje o certyfikowanym produkcie zawartym w zakresie certyfikatu. Aneks zawiera szczegółowe informacje o miejscach produkcyjnych i pakujących uwzględnionych w zakresie certyfikatu.

Jednostka Certyfikująca TÜV Rheinland Polska Sp. z o.o. oświadcza, że produkcja produktów objętych certyfikatem jest zgodna z zasadami standardu: GLOBALG.A.P.

Punkty Kontrolne i Kryteria Zgodności Standardu: Zintegrowane zapewnienie bezpieczeństwa i jakości w gospodarstwie, Wersja 5.1\_Lipiec2017, Zakres: Rośliny Uprawne, Podzakres: Owoce i Warzywa

Okres ważności:

Certyfikat jest ważny od 2018-08-22 do 2019-07-28.

Data wydania:

2018-08-22

Data podjęcia decyzji  
certyfikacyjnej:

2018-08-22

*Małgorzata Kręcka*  
Zatwierdzony przez Małgorzatę Kręcką

TÜV Rheinland Polska Sp. z o.o.  
ul. Komitetu Obrony Robotników 56, 03-146 Warszawa  
post@pl.tuv.com

Aktualny status Certyfikatu jest zawsze wyświetlany na stronie: <http://www.globalgap.org/search>

[www.tuv.com](http://www.tuv.com)



AC 141



**TÜVRheinland®**  
Precisely Right.

© TÜV Rheinland and TÜV are registered trademarks. Any other registered trademarks belong to their respective owners.





**Thank you for the  
attention**

**e-mail: [pkrawiec@hortiteam.pl](mailto:pkrawiec@hortiteam.pl)  
tel. +48 600 46 14 21**