

Breeding of Blackcurrant suitable for Processing and fresh market



Dr. Stan Pluta
Research Institute of Pomology
and Floriculture,
Skierniewice, Poland



FRUIT BREEDING DEPARTMENT (2 Laboratories)

- Lab. of Unconventional Breeding Methods (Biotechnology)
 - molecular studies



- Genetics and Breeding Lab.
 - genetic and methodological studies,
 - releasing of new cultivar



SMALL FRUIT CROPS GROWN COMMERCIALY AND BRED IN POLAND



Blackcurrant



Blueberry



Strawberry



Raspberry



Raspberry



FRUIT BREEDING DEPARTMENT

Main breeding directions

Breeding for resistance

Breeding for fruit quality

Breeding for good adaptation

Main breeding directions

- **Breeding for resistance** to main pests and diseases (including gall mite and reversion virus –BRV)
- **Breeding for fruit quality:**
 1. **Processing and freezing** (high content of anthocyanins, ascorbic acids, acidity and soluble solids – Brix)
 2. **Fresh consumption** (large and attractive fruits, sweet taste and aroma, uniform ripening, high quality)
- **Breeding for good adaptation** to local weather and soil conditions as well as for suitability to the **mechanical fruit harvest**

Breeding of blackcurrant for the suitability to:

- 75% for processing (machine harvest)

- ✓ High yield
- ✓ Strong plant growth
- ✓ Erect habit of plants
- ✓ Concentrated and even fruit ripening in strig (short strigs preferred)
- ✓ Easy picking of fruits („not drop off“)
- ✓ Different time of fruit ripening
- ✓ High fruit quality
- ✓ High resistance of plants to pests and diseases



Breeding of blackcurrant for the suitability to:

- 25% dessert fruits – fresh market (hand picked)

- Enhance the fresh fruit market
- Enrich the human diet with healthy fresh fruit
- Allow the grower to introduce innovative blackcurrant production technology
- Increase profitability of blackcurrant productivity



- **Cultural practices** – e.g. open field and protected cultivation on wires etc.

Desired fruit traits:

- ✓ Large berries preferred (1,5 g or more) on long strigs,
- ✓ Green strigs preferred
- ✓ High fruit quality (ascorbic acid, anthocyanins, others)
- ✓ Uniform fruit ripening
- ✓ Easy hand picked on strig



PROGRES IN THE FRUIT SIZE INCREASE



Desert type genotypes



DESSERT TYPE CULTIVARS



BONA
PL



'BIG BEN'
SCRI



GOFERT
PL



MOST IMPORTANT ACHIEVEMENTS IN BLACKCURRANT RELEASED



BONA



TIBEN



TISEL



ORES



RUBEN



TINES

New blackcurrant cultivars bred at the Research Institute of Pomology in Skierniewice, Poland

• grown on commercial plantations since:

2000



TISEL



TIBEN

2005



ORES



RUBEN



TINES

Plant Breeding Rights on EU territory till 2030

New blackcurrant cultivars bred at the Research Institute of Pomology in Skierniewice, Poland

• released and registered on the National List in Feb. 2009



GOFERT

'GOFERT'

Very productive,
Fruits – large and medium size, good taste, reach in ascorbic acid – vitamin C and extract,
Suitable for fresh market and for processing.
Plants resistant to fungal diseases.
Recommended for amateurs and commercial plantations, including „IP” and organic.

Assessment of the suitability of new Polish blackcurrant cultivars for commercial with machine fruit harvesting

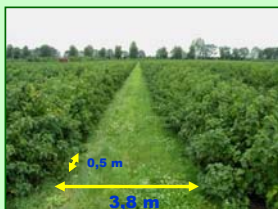


AIM OF EXPERIMENT:

Evaluation of suitability of new, Polish blackcurrant cultivars ('Tisel', 'Tiben', 'Ores', 'Ruben' and 'Tines') for commercial cultivation with picking fruits by harvesters.



Studies were carried out on the experiment (plantation – c. 3,0 ha) situated on the field of the Experimental Orchard at Dabrowice (near Skierniewice), Central Poland



- **Experiment** – established in autumn of 2003
- **New Polish cultivars:** 'Tisel', 'Tiben', 'Ores', 'Ruben' and 'Tines'
- **Standard cultivars:** 'Ojebyn' and 'Titania'
- **Studies conducted:** 2005- 2009

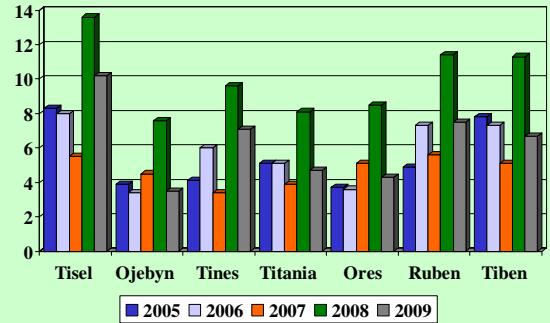
Experiment was established in random block design in 4 replications, with 50 bushes/plot, planted in the density of **3,80 x 0,50 m** (c. 5 000/ha). Bushes of each cultivar were grown in separated and neighboring rows of a length of c. 270 m.

The following traits were studied:

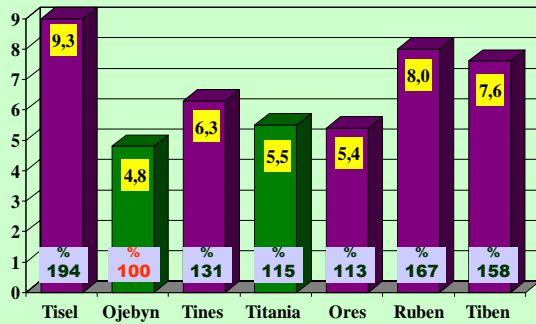
1. Date of ripening (harvesting) of fruits
2. Fruit yield [kg/plot] or [t/ha]
3. Weight of 100 fruits [g]
4. Size of bushes (height x width) [m²]
5. Susceptibility to fungal diseases [ranking scale 1-5], 1 – no symptoms of infection, 3 – medium infection, 5 - very strong infection of plants,
 - American powdery mildew (*Sphaerotheca mors-uae*)
 - Leaf spot (*Drapenopezia ribis*)
 - White pine blister rust – WPBR (*Cronatrium ribicola*)
6. Damages of plants by the harvester during fruit picking
7. Losses of the fruit yield (left on bushes and dropped off to the ground) [kg/bush] and [kg/ha]
8. Accuracy (effectiveness) of fruit harvesting by the self-propelled „KPS-4b” – Polish made harvester [%].

RESULTS 2005-2009

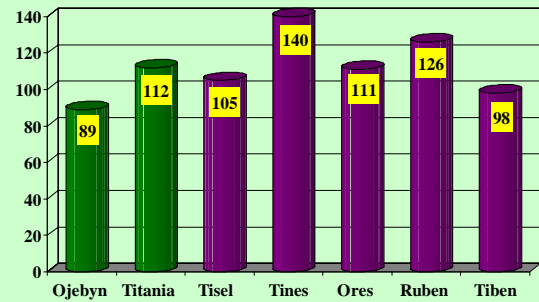
FRUIT YIELD [t/ha]
(2005-2009, cultivars in order of fruit ripening)
2005- hand picking, 2006-2009 – picking by harvester



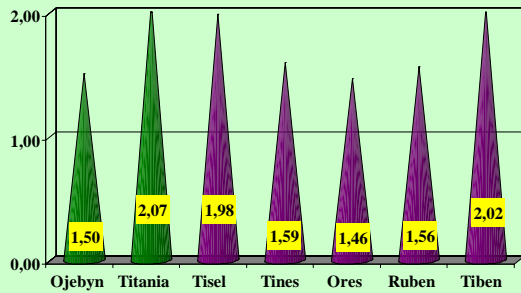
FRUIT YIELD [t/ha]
(cultivars in order of fruit ripening)
2006-2009 – picking by harvester (average for years)



FRUIT SIZE [weight of 100 berries in g]
(average for 2005-2009)

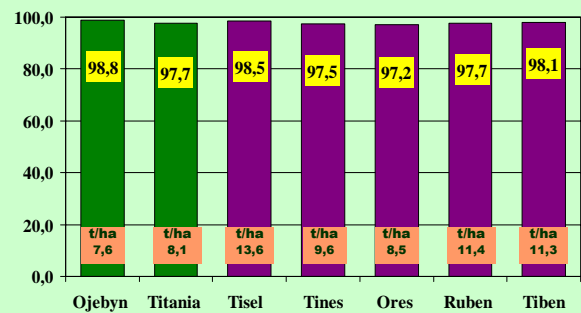


SIZE of BUSHES (height x width), [m²]
(average for 2005-2009 r.)

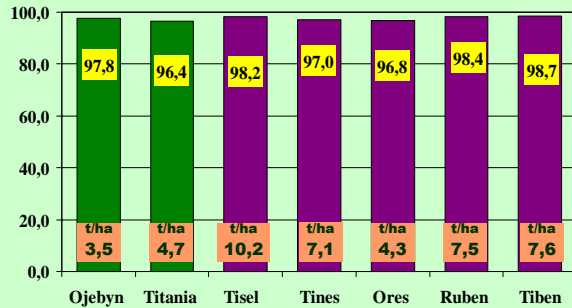


Uszkodzenia pędów: największe: 'TITANIA' i 'TISEL'
średnie: 'ORES' i 'RUBEN', 'TIBEN' i 'TINES'

Effectiveness of fruit picking by harvester [%]
(2008)



**Effectiveness of fruit picking by harvester [%]
(2009)**



**Susceptibility of plants to fungal diseases
(average for 2006-2009), [ranking scale 1-5] ***

Cultivar	Susceptibility of plants to fungal diseases		
	American powdery mildew	Leaf spot	White pine blister rust
1. Ojebyn	1,0	3,7	2,7
2. Titania	1,0	2,5	1,0
3. Tisel	1,0	2,9	1,0
4. Tines	1,0	3,4	1,8
5. Ores	1,0	2,7	1,0
6. Ruben	1,0	2,9	1,0
7. Tiben	1,0	2,0	1,2

* - ranking scale 1-5, 1 - no symptoms, 3 - medium infection, 5 - very severe infection of plants

SUMMARY:

1. New Polish cultivars ('Tisel', 'Tiben', 'Ruben', 'Tines' and 'Ores') confirmed their high production value. They produce medium-sized or large fruits. Plants are highly resistant to serious fungal diseases.
2. All new Polish cultivars tested in this experiment showed the good usefulness for the fruit picking by harvester. In this respect they equal with standard cultivar 'Ojebyn', they exceed the second standard cultivar 'Titania'.
3. Carrying out the blackcurrant breeding program we can continuously increase the production potential of cultivars in Poland. Implementation of new and reliable cultivars will have considerable influence for optimizations of the production of this fruit in Poland and fortifying our position in world.



THANK YOU FOR YOUR ATTENTION