



The blackcurrant breeding programme in Poland – Aims and recent achievements



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The Research Institute of Pomology and Floriculture (***since 2011 Research Institute of Horticulture***) in Skierniewice, Poland is the main centre of top and small fruits breeding, including **blackcurrant (*Ribes nigrum* L.) breeding programme**

Year of starting the breeding programme	1986 -
Who finances the breeding	Government
How many crosses are done per year	50-70
How many seedlings are produced a year	5000-8000
How many seedlings have been under evaluation in the selection fields for 25 years	>105.500
How many advanced clones were selected during last five years	70
How many genotypes/cultivars are maintained in the „working” breeding collection	125
How many new cultivars have been released for last five years	3
Name of cultivars which have been released and registered in Poland or UE	‘Tisel’, ‘Tiben’, ‘Ores’, ‘Ruben’, ‘Tines’, ‘Gofert’

FRUIT BREEDING DEPARTMENT (2 Laboratories)

1. Genetics and Breeding Laboratory

2. Laboratory of Unconventional Breeding Methods (*Biotechnology*)

Main activities:

- Genetic, methodological and molecular studies
- Development of new cultivars

The blackcurrant breeding has been carried out at the Fruit Breeding Department, in different facilities:

- 1. Working „breeding collection (germplasm)**
- 2. High plastic tunnel,**
- 3. Glasshouses**





4. Selection fields at the Experimental Station at Dabrowice, near Skierniewice





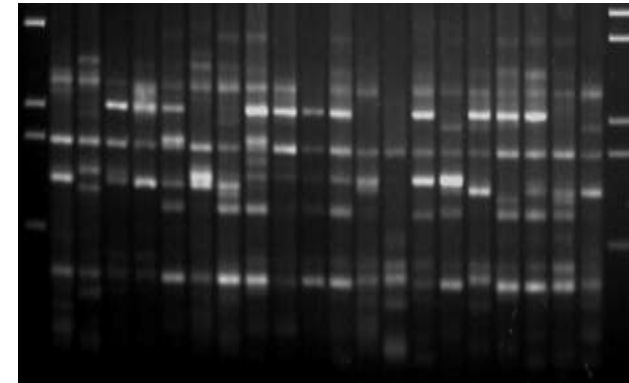
Traditional cross combination:

a/ direct hybridization, b/ interspecific hybridization

Supported by:

- methodological studies on breeding value (GCA and SCA effects) of parental forms, inheritance and variability of selected traits,
- the molecular biology (*in vitro*, embryo rescue and DNA fingerprinting, markers, MAS – Marker Assisted Selection)

2. Mutation (small scale in the past)



Crossing programs – under cover



Hybridization – traditional cross combination



X



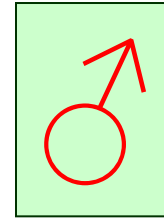
Blackcurrant
(*Ribes nigrum* L.):

‘Foxendown’, ‘Ceres’,
‘Tiben’, ‘Ores’,
‘Czereszniowa’
breeding lines and
others

Blackcurrant
(*Ribes nigrum* L.):

‘Ben Gairn’, ‘Ben Hope’,
‘Foxendown’, ‘Ruben’,
‘Gofert’ and others

Interspecific hybridization



GOOSEBERRY
Ribes grossularia



RED CURRANT
Ribes rubrum

Blackcurrant
(Ribes nigrum L.):

X

‘Foxendown’, ‘Ceres’,
‘Tiben’, ‘Ores’,
‘Czeresznieva’,
‘Ben Gairn’



R. sanguineum

PRODUCTION OF SEEDLINGS IN GLASSHOUSE

(January 15 - May 30)



Aims and breeding efforts

**Breeding for
resistance**

to main pests
and diseases,
including gall
mite, BRV and
fungal diseases

**Breeding for
fruit quality**

and suitability
for processing
and freezing
as well as fresh
market

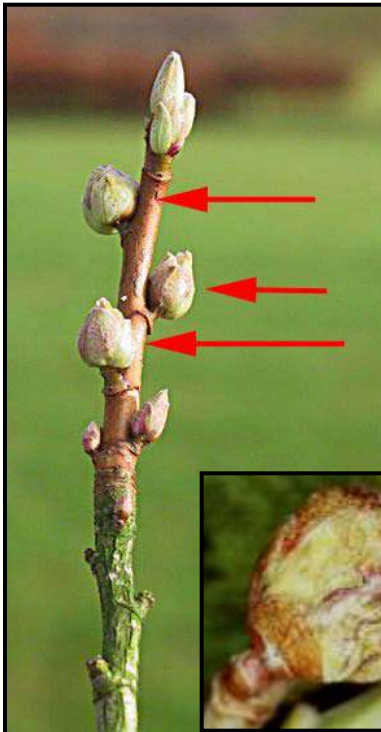
**Good
adaptation**

to local
environmental
conditions (winter
hardiness, spring
frost tolerance,
chilling requirements
and machine fruit
harvest).

Aims and breeding efforts

Breeding for resistance to:

- the most harmful pest - **gall mite** (*Cecidophyopsis ribis* Westw.)
- and **Blackcurrant Reversion Virus (BRV)** transmitted by the gall mite (vector) remains a high priority.



5-7 000
mites/buds



GALL MITE



Characteristic symptoms „big buds”

Blackcurrant Reversion Virus (*BRV*)

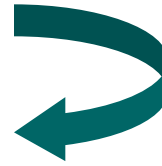
R Type



E Type



Both types of BRV cause the sterility of flowers and consequence reduce yield of blackcurrant plants



Powdery mildew
(*Sphareotheca mors-uvae*)



Leafspot
(*Drepanopeziza ribis* Kleb.)



White Pine Blister Rust - WPBR,
(*Cronartium ribicola* Fisch.)

Main breeding directions

- **Breeding for fruit quality:**

- 1. Processing and freezing:**

- high content of anthocyanins, ascorbic acids, acidity and soluble solids – Brix and polyphenols)

- 2. Fresh market** (increasing interest, related to health benefits)

- large and attractive fruits, long and green strigs, sweet taste, aroma, uniform ripening, good shelf-life,

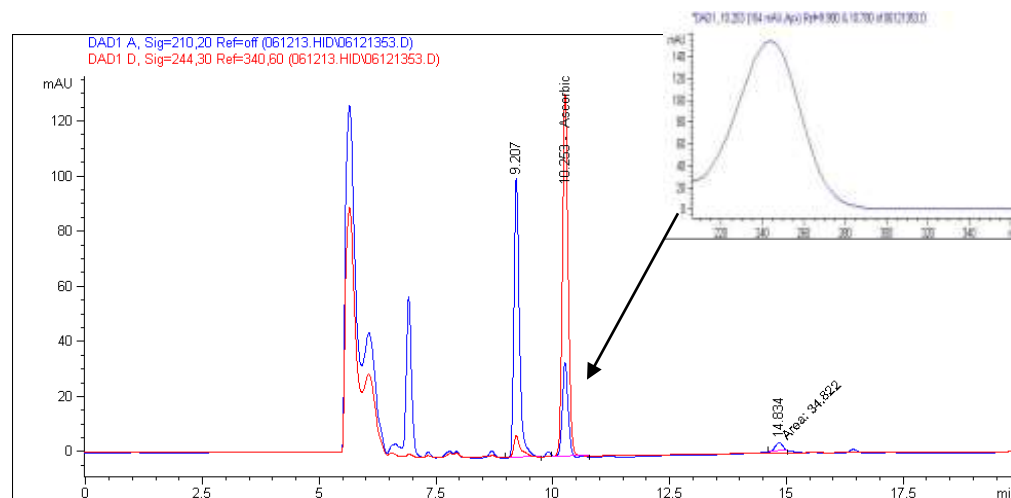
- hand picked on strig

- different cultural practices :

- open field cultivation
- protected cropping in the high-tunnels, on wires

Analytical methods

- **Soluble solids content** – by refractometer, according to Polish Standard PN-90/A-75101/02
- **Titrateable acidity** – according to Polish Standard PN-90/A-75101/04, expressed as citric acid
- **Anthocyanins** – by pH differential method (Wrolstad, 1976);
- **Ascorbic acid**
– by an HPLC method



DESSERT BLACKCURRANT CULTIVARS

„NEW FASION or JUST LIFE”

<u>Blackcurrant</u>	- 181,0
Strawberry	- 58,8
Orange	- 53,2
Lemon	- 53,0
Blueberry	- 37,0
Grapefruit	- 34,4
Raspberry	- 26,2
Blackberry	- 21,0
Grapes	- 10,8
Apricot	- 10,0
Sour cherry	- 10,0
Plum	- 9,5
Bananas	- 8,7
Sweet cherry	- 7,0
Peach	- 6,6
Apple	- 4,6
Pear	- 4,2



Average ascorbic acid (vit. C)
content in fruit (mg/100g fresh weight)



Progress in increasing of fruit size (dessert type blackcurrant cultivars)





BONA
(1,8 g)

CZERESZNIEWA
(1,4 g)

D 13B/11
(2,4 g)

ADVANTAGES OF BLACKCURRANT FRESH FRUIT PRODUCTION

CONSUMERS

- Enhancing the fresh fruit market
- Enriching the human diet in a very healthy fresh fruit



FRUIT GROWERS

- Increasing profitability of blackcurrant production
- Allowing the growers to introduce innovative technology of blackcurrant production (open field, protected cultivation, off season production)





ACHIVMENTS

25 YEARS OF BREEDING

(1986-2011)



New blackcurrant cultivars released at the RPIF Skierniewice, Poland

The List of Cultivars released in Poland

In 2000



In 2005



PBR on the territory of EU till 2029-2030

New blackcurrant cultivar released at the RIPF in Skierniewice, Poland

- released and registered on the National List in February 2010

‘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 commercial plantations (and amateurs) including „IP” and organic.

**The newest blackcurrant cultivars submitted in 2009
for the final evaluation before registration
at the National Research Centre for Cultivar Testing
(COBORU)**

‘POLARES’



Breeding clone PC-7/13

‘TIHOPE’



Breeding clone PC-425

‘POLARES’ – late cultivar



- Productive
- Fruits – medium size and small
- Suitable for processing(high content of acidity, anthocyanins and ascorbic acid)
- **Resistant to the gall mite**, powdery mildew and medium susceptible to WPBR
- The suitability to machine fruit harvest is being under investigation.

‘TIHOPE’ – medium-early cultivar



- Productive
- Fruits – large and medium size
- Suitable for processing and freezing (high content of extract, acidity, and anthocyanins, medium content of ascorbic acid)
- Resistant to the powdery mildew, WPBR , but susceptible to gall mite
- The suitability to machine fruit harvest is being under investigation.

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