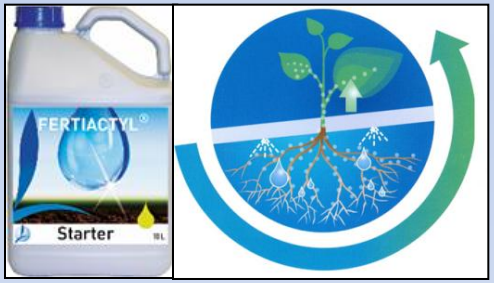
Achievements in breeding of new cultivars and agronomical practices in blackcurrants in Poland



Dr. Stan Pluta
Research Institute of Horticulture
in Skierniewice, Poland

Dr. Piotr Baryla
University of Life Science
in Lublin, Poland

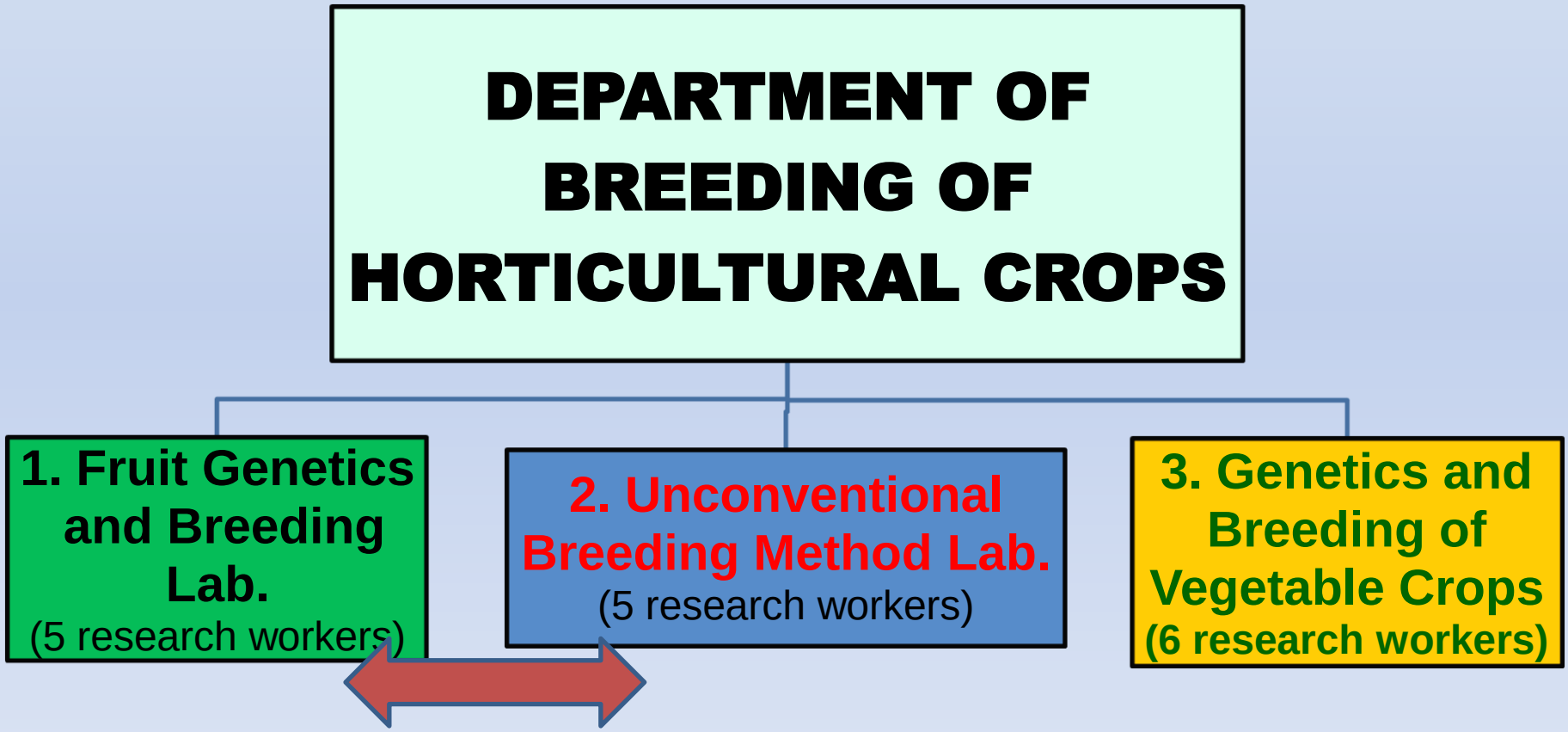
5th. IBA Conference, Ashford, UK, 14-16 June, 2016

The Blackurrant Breeding is conducted at the Department of Breeding of Horticultural Crops of the Research Institute of Horticulture (INHORT) in Skierniewice, Central Poland.

- high plastic tunnel and field cultivar collection at the Pomological Orchard in Skierniewice
- glasshouse
- selection fields at the Experimental Orchard at Dąbrowice, Skierniewice

Organization of Department of Breeding of Horticultural Crops

(3 laboratories) – since, 2 April, 2015



BLACKCURRANT BREEDING PROGRAM
(2 Laboratories)

1. Fruit Genetics and Breeding Lab.
- genetic and methodological studies,
- **releasing of new cultivars**




2. Unconventional Breeding Method Lab.
(Biotechnology)
- molecular studies

(NOT GMO !!!)



Fruit Genetics and Breeding Lab. of INHORT

Dr. Stanislaw Pluta – **blackcurrant,** gooseberry (*Ribes sp*.)
and hig-bush blueberry *(Vaccinium)*

BLACKCURRANT BREEDING 1986 -2016

NEW CULTIVARS SUITABLE FOR:

- 75% for processing and freezing (machine harvest),

- 25% dessert – fresh market (hand picked)

Conventional Breeding

Crossing programs are mainly done under cover (high-plastic tunnel)

- **Classical, hybridization breeding methods**

1. **Crossing of selected parental forms** (according to DNA polyphormism, phenotypic evaluation in the collection and genetic studies
2. **Evaluation of F_1 seedling progenies**
3. **Selection of breeding material** (best individual are selected) and propagated
4. **Further evaluation and selecting of best clones**

Hybridization – traditional cross combination

X

Blackcurrant
(Ribes nigrum L.):

‘ Foxendown’, ‘Ceres’,
‘Tiben’, ‘Ores’,
‘Gofert’ and others

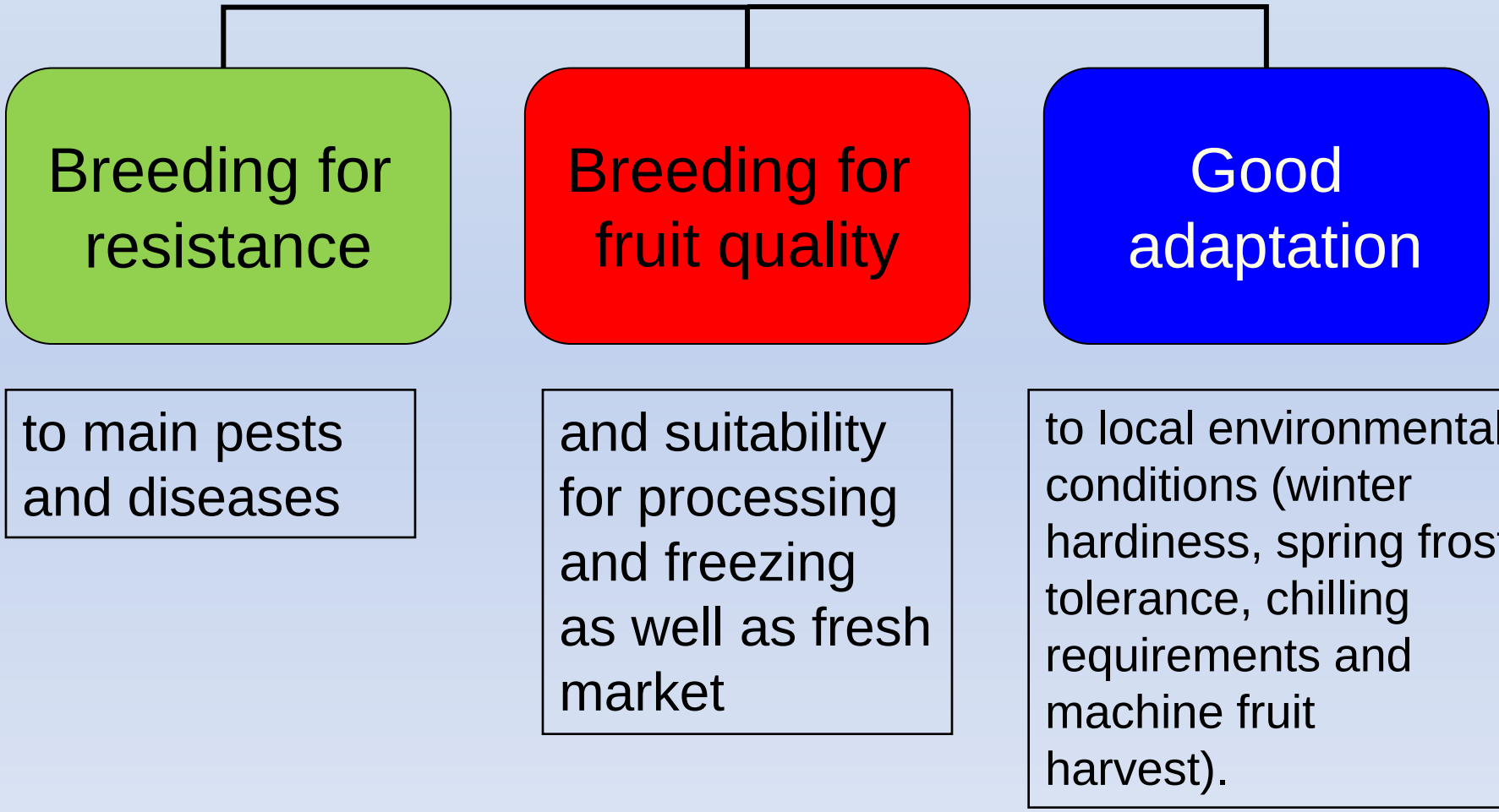
Blackcurrant
(Ribes nigrum L.):

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

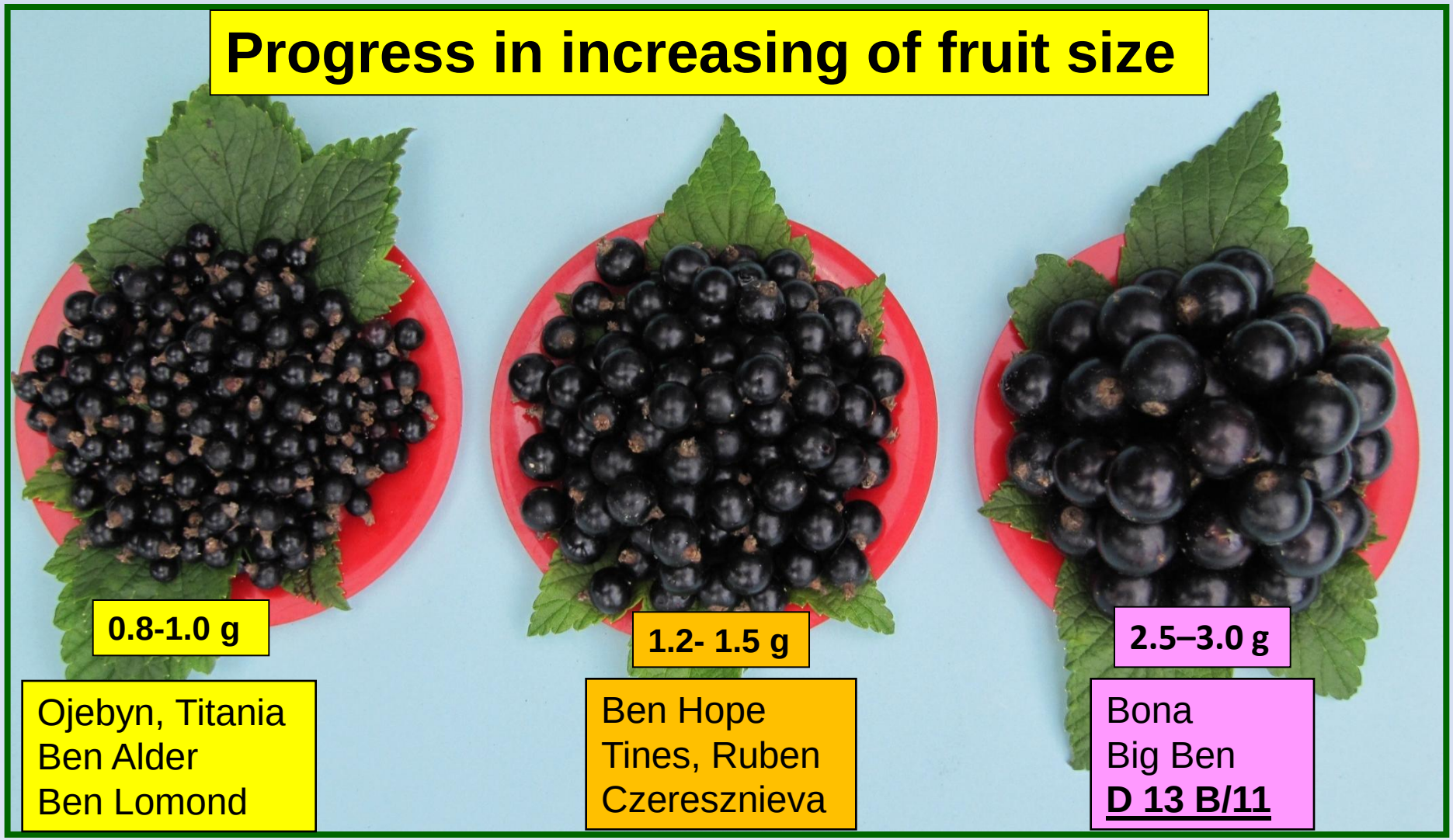
Production of seedlings in the glasshouse

January 30 – April 15/30

Aims and breeding efforts



Blackcurrant Breeding
– Desert cultivars for Fresh Market



Achievements – new cultivars released
1986-2016

LP.	CULTIVAR	Year of registration	Share in production in Poland (%)
1	**TISEL**	2000	50
2	**TIBEN**	2000	12
3	**ORES**	2005	4
4	**TINES**	2005	2
5	**RUBEN**	2005	8
6	**GOFERT**	2010	4
7	**POLARES**	2014	1.0
8	**TIHOPE**	2014	0.5
9	**POLBEN ***	2017/18	-
10	**POLONUS ***	2017/18	-

= **81,5%**

ACHIEVEMENTS

Blackcurrant cultivars released and register into the National List of Cultivars and Plant Breeding Rights (PBR)

2000

2005

Cultivars are also protected by the PBR on territory of UE till 2025-2030

NEW Blackcurrant cultivars released and register into the National List of Cultivars and Plant Breeding Rights (PBR)

2010

2014

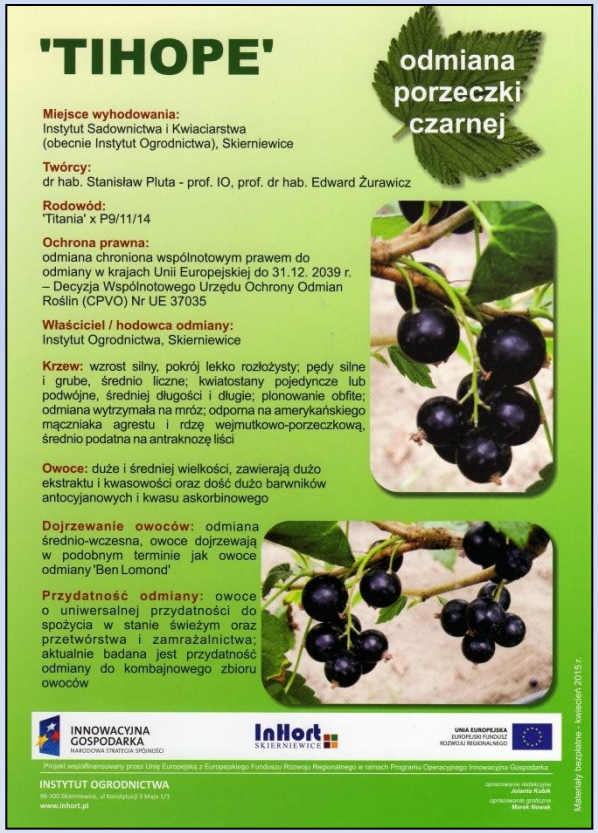
These cultivars are also protected by the PBR on territory of UE till 2025-2030

MAIN TRAITS OF NEW BLACKCURRANT CULTIVARS

- High productivity
- Resitance/low susceptibility to pests and diseases
- Good fruit quality and suitability for processing, freezing and fresh market
- Adaptability for cultivation in Polish weather and soil conditions
- Suitability to modern technology of fruit production

RESEARCH INSTITUTE OF HORTICULTURE

Promotion



NEW BLACKCURRANT CULTIVARS SUBMITED FOR PBR in CANADA and PLANT PATENT in the USA - 2014

‘GOFERT’, ‘POLARES’ and ‘TIHOPE’

- **Canadian Food Inspection Agency, Ottawa, Ontario, Canada**
- **US Patent & Trademark Office, Alexandria, Virginia, USA**

PBR Plant Breeder's Rights CANADA

P Plant Patent USA

RESEARCH INSTITUTE OF HORTICULTURE

CULTIVAR	Number of granted licenses in 2011 - 2015
BLACKURRANT	
‘GOFERT’	11
POLARES’	7
‘TIHOPE’ ‘	8

SUMMARY

We are convinced that the new cultivars will be:

An important carrier of biological progress of blackcurrant production in Poland

Contribute to maintaining of high position of Polish blackcurrant production

Foster its competitiveness, while maintaining plant protection requirements of the environment and principles of safe food production

Biostimulation – agronomical factor

MATERIALS and METHODS

- Studies – 2014 & 2015
- Commercial plantation in Eastern Poland
- cv. '**Tisel**' - area of 2 ha (1 ha - biostimulation, 1 ha - control)
- 3-year-old plants tested
- Two biostimulated fertilizers (Timac Agro) were applied:

a/ Fertiactyl

b/ Fertileader

Control - fertilizers of similar composition, but without the biostimulation (commercially available on the Polish market)

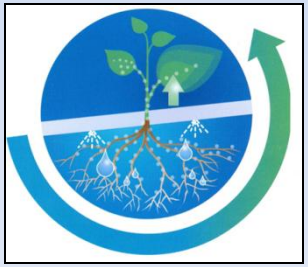
Aims of studies:

1. **Increasing of the fruit yield potential** – **Productivity**
2. **Improving of the fruit quality** - **Processing parameters**

FERTIACTYL® – innovative start-up fertiliser

1. Humic and fulvic acids	→	They facilitate accessibility and assimilability of nutrients
2. Glycine Betaine	→	Anti-stress action Photosynthesis intensification
3. Zeatin	→	Radicular system growth Chlorophyll aging delay
4. Nutrients • 13% nitrogen • 5% phosphorus • 8% potassium	→	Growth - vigour Ripenning - Quality

Timac AGRO Polska

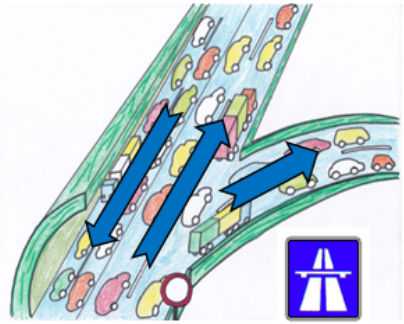


FERTILEADER®

Strength of nature

Macro-nutrients + Seactiv + Micro-nutrients

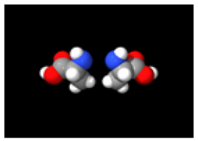
1. IPA
Fast transport of mineral ingredients and assimilative substances



2. Glycine Betaine
Anti-stress action
Photosynthesis

3. Amino acids

- Growth of the vegetative and radicular system
- Production proteins and sugars
- Immediately available micro-nutrients



Timac AGRO Polska

26.03.2016

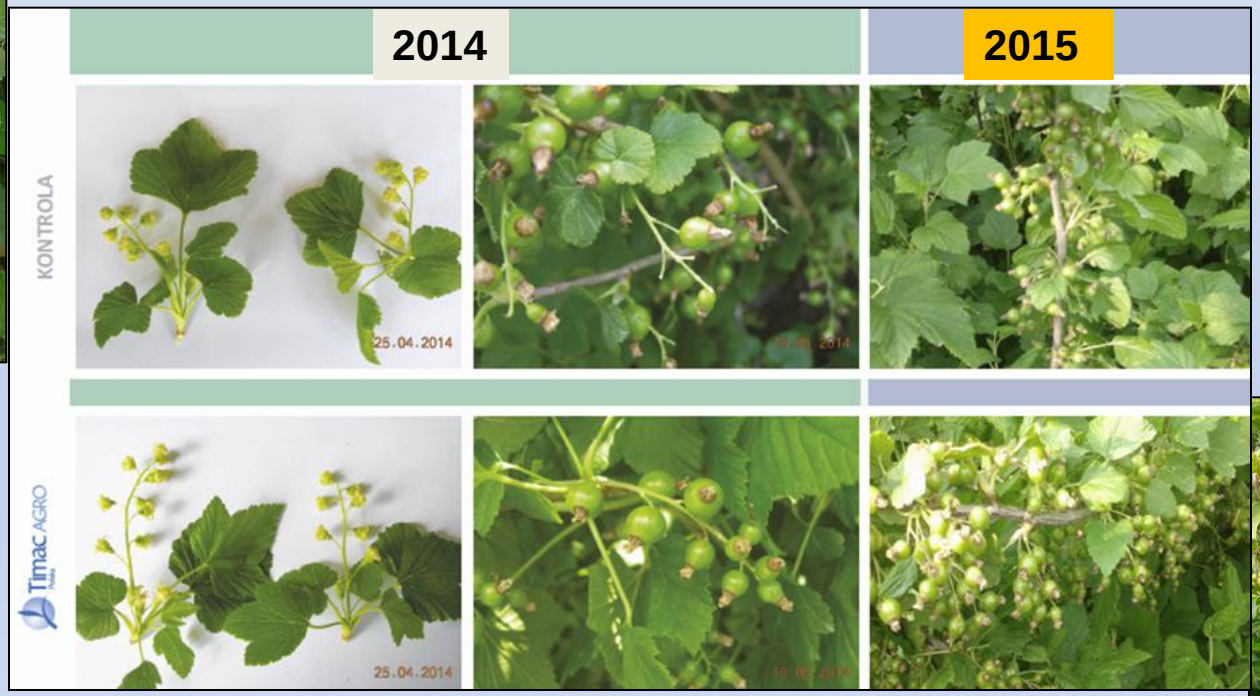
First biostimulation - complex Fertiactyl ® Starter

12.04.2015

Second biostymulation - complex Seactiv ® (Fertileader LEOS, Fertileader GOLD BMo)

RESULTS

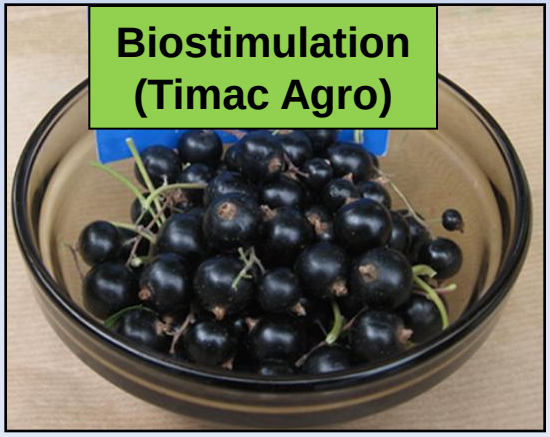
Control

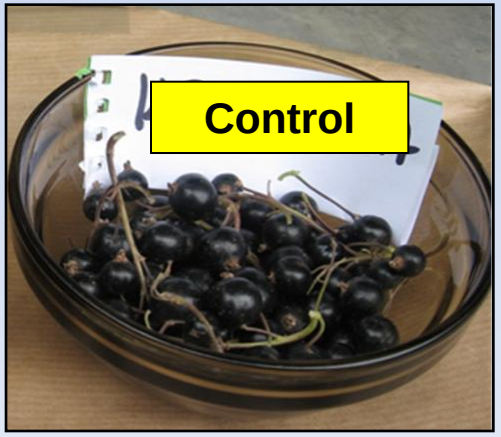


Biostymulation - complex SEACTIV ®
(Ferdileader AXIS, Fertileader VITAL-954)

Effect of biostimuleted fertilizers on the flowering, fruit set and yield of blackcurrant cultivar 'Tisel'

TRAITS	Biostimulation (Timac Agro)		Control	
	2014	2015	2014	2015
No. of cluster on the shoots	**29.4**	**42.5**	27.1	35.0
No of flowers per cluster	7.3	**7,1**	**7.6**	6.9
Fruit set (%)	83.0	77.5	**86.1**	77.8
Weight of 100 berries (g)	**133.1**	**131.7**	122.5	121.0
Fruit yield (kg/bush)	**2.51**	**3.52**	2.08	2.94
Fruit yield (t/ha)	**12.5**	**17.6**	**10.4**	**14.7**





Effect of biostimuled fertilizers on fruit quality of blackcurrant cv. 'Tisel'

TRAITS	Biostimulation (Timac Agro)		Control	
	2014	2015	2014	2015
Harvesting				
Extract, °Brix	15.8	17.4	14.5	16.0
Fruit firmness, N	3.30	5.26	2.25	4.63
After 7 days				
Extract, °Brix	14.7	16.0	13.3	14.8
Fruit firmness, N	3.18	3.45	-	2.71

CONTROL

Biostymulation - complex SEACTIV ® (Fertileader ELITE)

Harvesting 11.07.2015

Summary:

Complex biostimulative program had a significant impact on yield potential and fruit quality:

- ✓ **larger no of strigs on shoot** (in the 2nd. year an increase of 21.4%),
- ✓ **larger fruit size (weight)** (2014 - 8.65%; 2015 - 8.84%),
- ✓ **increase of fruit yield by 0.5 kg/bush** (an average over 2 years),
- ✓ **bigger total fruit yield** - an average of more than 19% over two years, (differences – 2.1 t/ha in 2014, and 2.8 t/ha in 2015)
- ✓ **increase of extract** - °Brix (8.5%) and fruit firmness.
- ✓ **<u>in control</u> fruits fermented faster** (sugar content decreased) and consequently, fruit firmness was reduced either.

New implementations - blackcurrant cv. 'Jubilejnaja Kopania' (2015)

26.03.2015

16.04.2015

27.04.2015

25.05.2015

15.06.2015

15.07.2015

THANK YOU
FOR YOUR ATTENTION