Saila Karhu
October 14 2014

Improving berry varieties through the identification and utilisation of the best genetic resources

— Data mining of the existing characterisation data of blackcurrant

Sub-Task 1.1.1 Data mining of existing characterisation data

Aim: To identify subsets of accessions with valuable characteristic combinations, both for breeding and commercial use

•Work was based on the information collected in the EU AGRI GEN RES project RIBESCO (2007– 2011)

•Quality information (6-40 descriptors per accession) of 634 accessions of **blackcurrant** that has been collected and included in the ECP/GR Ribes/Rubus Database

The traits recorded include :

Morphological traits

mainly for characterization

•Agronomic traits:

- phenology
- yield and fruit size
- pathogen and winter resistance etc.

•Some aspects of fruit quality:

- soluble solids
- vitamin C content
- total anthocyanins etc.

Data

- accessions conserved in *ex situ* collections
- Descriptors of CPVO + others

(EU Community Plant Variety Office CPVO; UPOV)

Action 071 AGRI GEN RES 870/2004 (RIBESCO) received financial support from the European Commission, Directorate-General for Agriculture and Rural Development, under Council Regulation (EC) No 870/2004.

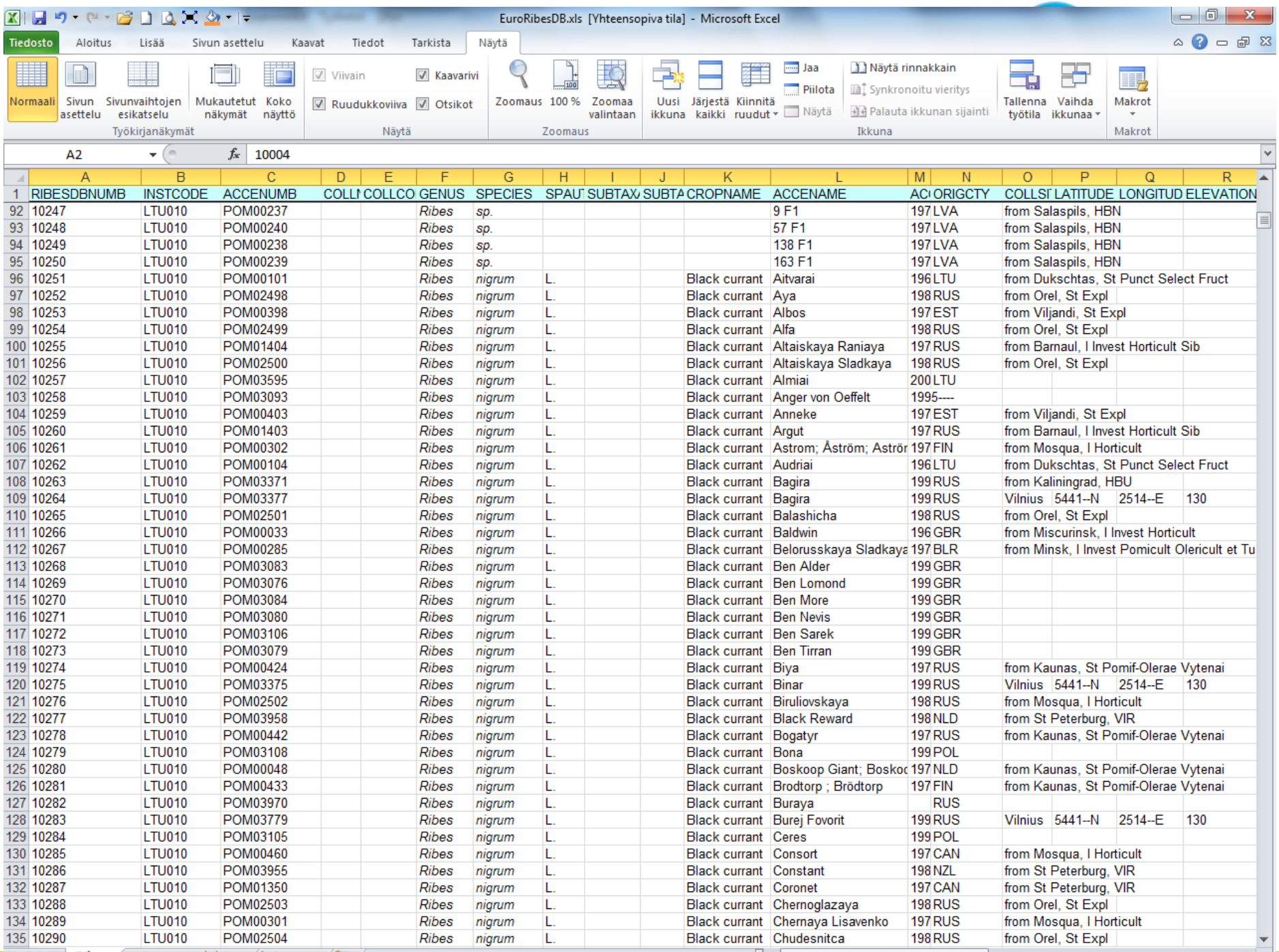
MTT Agrifood Research Finland, Finland ; Estonian University of Life Sciences, Estonia; Institute of Horticulture, Poland; Swedish University of Agricultural Science, SLU, Sweden; Vilnius University, Lithuania; Lithuanian Research Centre for Agriculture & Forestry, Lithuania; Federal Office of Plant Varieties, Germany; Latvian State Institute of Fruit Growing, Latvia; University of Copenhagen, Denmark

Descriptors used in the WP2 of RIBESCO Action with the number of observed accession and their percentage of all accessions in Partners' collections

Minimum descriptors of blackcurrant	n	%
Time of bud burst	627	97
Time of beginning of flowering	637	99
Time of fruit ripening	614	95
Plant habit	637	99
Young shoot: anthocyanin coloration of leaf and stem	629	97
Fully developed leaf: green coloration	629	97
Leaf: shape of base of blade	625	97
Flower: Predominant number of trusses per bud	564	87
Fruit: Uniformity of ripening within a truss	597	92
Fruit: shape in lateral view	611	95
Fruit: size	619	96
Fruit: firmness of skin	608	94
Fruit: colour	610	94
Fruit: length of truss	606	94
Fruit: total soluble solids	537	83
Susceptibility to powdery mildew	640	99
Winter damage	641	99
Plant vigour	609	94
Plant: yield	563	87

Optional descriptors of blackcurrant	n	%
Plant: height	512	79
Plant: number of basal shoots	448	69
Bud: antocyanin coloration	338	52
Leaf: anthocyanin coloration of petiole	379	59
Self-fertility	83	13
Fruit: skin thickness	413	64
Fruit: bloom	416	64
Fruit: separation from stalk	419	65
Fruit: Total Anthocyanins	248	38
Fruit: Total phenols	50	8
Fruit: content of Vitamin C	330	51
Fruit: Titrable acids	219	34
Fruit: pH	217	34
Susceptibility to Black currant reversion virus	276	43
Susceptibility to Septoria leaf spot (Mycospaerella ribis)	482	75
Susceptibility to: Leafspot, Anthracnose (Drepanodeziza ribis, Pseudopeziza ribis)	540	84
D. Susceptibility to Blister rust (Cronartium ribicola)	288	45
Susceptibility to: Grey mould (Botrytis cinerea)	123	19
Susceptibility to: Gall mite (Cecidophyopsis ribis)	381	59
Susceptibility to: Two spotted spider mite (Tetranychus urticae)	168	26
H. Susceptibility to: Spring frost	128	20
Fruit size uniformity	121	19
Fruit: Specific aroma	64	10
Fruit :Astringent taste	119	18
Fruit flavour	121	19

http://www.ribes-rubus.gf.vu.lt/



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	RIBESDBNUMB	INSTCODE	ACCENUMB	COLLI	COLLCO	GENUS	SPECIES	SPAU	SUBTAX/	SUBTA	CROPNAME	ACCENAME	AC	ORIGCTY	COLLSI	LATITUDE	LONGITUD	ELEVATION
92	10247	LTU010	POM00237			*Ribes*	*sp.*					9 F1	197	LVA	from Salaspils, HBN			
93	10248	LTU010	POM00240			*Ribes*	*sp.*					57 F1	197	LVA	from Salaspils, HBN			
94	10249	LTU010	POM00238			*Ribes*	*sp.*					138 F1	197	LVA	from Salaspils, HBN			
95	10250	LTU010	POM00239			*Ribes*	*sp.*					163 F1	197	LVA	from Salaspils, HBN			
96	10251	LTU010	POM00101			*Ribes*	*nigrum*	L.			Black currant	Aitvarai	196	LTU	from Dukschtas, St Punct Select Fruct			
97	10252	LTU010	POM02498			*Ribes*	*nigrum*	L.			Black currant	Aya	198	RUS	from Orel, St Expl			
98	10253	LTU010	POM00398			*Ribes*	*nigrum*	L.			Black currant	Albos	197	EST	from Viljandi, St Expl			
99	10254	LTU010	POM02499			*Ribes*	*nigrum*	L.			Black currant	Alfa	198	RUS	from Orel, St Expl			
100	10255	LTU010	POM01404			*Ribes*	*nigrum*	L.			Black currant	Altaiskaya Raniaya	197	RUS	from Barnaul, I Invest Horticult Sib			
101	10256	LTU010	POM02500			*Ribes*	*nigrum*	L.			Black currant	Altaiskaya Sladkaya	198	RUS	from Orel, St Expl			
102	10257	LTU010	POM03595			*Ribes*	*nigrum*	L.			Black currant	Almiai	200	LTU				
103	10258	LTU010	POM03093			*Ribes*	*nigrum*	L.			Black currant	Anger von Oeffelt	1995	----				
104	10259	LTU010	POM00403			*Ribes*	*nigrum*	L.			Black currant	Anneke	197	EST	from Viljandi, St Expl			
105	10260	LTU010	POM01403			*Ribes*	*nigrum*	L.			Black currant	Argut	197	RUS	from Barnaul, I Invest Horticult Sib			
106	10261	LTU010	POM00302			*Ribes*	*nigrum*	L.			Black currant	Astrom; Åström; Aströr	197	FIN	from Mosqua, I Horticult			
107	10262	LTU010	POM00104			*Ribes*	*nigrum*	L.			Black currant	Audriai	196	LTU	from Dukschtas, St Punct Select Fruct			
108	10263	LTU010	POM03371			*Ribes*	*nigrum*	L.			Black currant	Bagira	199	RUS	from Kaliningrad, HBU			
109	10264	LTU010	POM03377			*Ribes*	*nigrum*	L.			Black currant	Bagira	199	RUS	Vilnius	5441--N	2514--E	130
110	10265	LTU010	POM02501			*Ribes*	*nigrum*	L.			Black currant	Balashicha	198	RUS	from Orel, St Expl			
111	10266	LTU010	POM00033			*Ribes*	*nigrum*	L.			Black currant	Baldwin	196	GBR	from Miscurinsk, I Invest Horticult			
112	10267	LTU010	POM00285			*Ribes*	*nigrum*	L.			Black currant	Belorusskaya Sladkaya	197	BLR	from Minsk, I Invest Pomicult Olericult et Tu			
113	10268	LTU010	POM03083			*Ribes*	*nigrum*	L.			Black currant	Ben Alder	199	GBR				
114	10269	LTU010	POM03076			*Ribes*	*nigrum*	L.			Black currant	Ben Lomond	199	GBR				
115	10270	LTU010	POM03084			*Ribes*	*nigrum*	L.			Black currant	Ben More	199	GBR				
116	10271	LTU010	POM03080			*Ribes*	*nigrum*	L.			Black currant	Ben Nevis	199	GBR				
117	10272	LTU010	POM03106			*Ribes*	*nigrum*	L.			Black currant	Ben Sarek	199	GBR				
118	10273	LTU010	POM03079			*Ribes*	*nigrum*	L.			Black currant	Ben Tirran	199	GBR				
119	10274	LTU010	POM00424			*Ribes*	*nigrum*	L.			Black currant	Biya	197	RUS	from Kaunas, St Pomif-Olerae Vytenai			
120	10275	LTU010	POM03375			*Ribes*	*nigrum*	L.			Black currant	Binar	199	RUS	Vilnius	5441--N	2514--E	130
121	10276	LTU010	POM02502			*Ribes*	*nigrum*	L.			Black currant	Biruliovskaya	198	RUS	from Mosqua, I Horticult			
122	10277	LTU010	POM03958			*Ribes*	*nigrum*	L.			Black currant	Black Reward	198	NLD	from St Peterburg, VIR			
123	10278	LTU010	POM00442			*Ribes*	*nigrum*	L.			Black currant	Bogatyr	197	RUS	from Kaunas, St Pomif-Olerae Vytenai			
124	10279	LTU010	POM03108			*Ribes*	*nigrum*	L.			Black currant	Bona	199	POL				
125	10280	LTU010	POM00048			*Ribes*	*nigrum*	L.			Black currant	Boskoop Giant; Boskoc	197	NLD	from Kaunas, St Pomif-Olerae Vytenai			
126	10281	LTU010	POM00433			*Ribes*	*nigrum*	L.			Black currant	Brodtorp ; Brödtorp	197	FIN	from Kaunas, St Pomif-Olerae Vytenai			
127	10282	LTU010	POM03970			*Ribes*	*nigrum*	L.			Black currant	Buraya		RUS				
128	10283	LTU010	POM03779			*Ribes*	*nigrum*	L.			Black currant	Burej Fovorit	199	RUS	Vilnius	5441--N	2514--E	130
129	10284	LTU010	POM03105			*Ribes*	*nigrum*	L.			Black currant	Ceres	199	POL				
130	10285	LTU010	POM00460			*Ribes*	*nigrum*	L.			Black currant	Consort	197	CAN	from Mosqua, I Horticult			
131	10286	LTU010	POM03955			*Ribes*	*nigrum*	L.			Black currant	Constant	198	NZL	from St Peterburg, VIR			
132	10287	LTU010	POM01350			*Ribes*	*nigrum*	L.			Black currant	Coronet	197	CAN	from St Peterburg, VIR			
133	10288	LTU010	POM02503			*Ribes*	*nigrum*	L.			Black currant	Chernoglazaya	198	RUS	from Orel, St Expl			
134	10289	LTU010	POM00301			*Ribes*	*nigrum*	L.			Black currant	Chernaya Lisavenko	197	RUS	from Mosqua, I Horticult			
135	10290	LTU010	POM02504			*Ribes*	*nigrum*	L.			Black currant	Chudesnitca	198	RUS	from Orel, St Expl			

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Search

DB number:
SPECIES:
Country of origin:
Holding institute:
Status of sample:
Search for (part of) the accession name: Mortt
Search for (part of) the accession number:
Search for accessions with research data:

Order

Order results by: Species | Institute | Country of origin | Accession name | Accession number

Order direction: Ascending | Descending

Search | Clear fields

Search results - single click row to see all passport data

Page 1 of 256 — Displaying records 1 - 10 of 2552

	ID	Holding institute	Accession number	Species	Accession name	Sample status	Country of origin	Research data
1	10004	POL029	RIB_ISK_0005	nigrum	Ben Alder	500	GBR	http://www.ribes-...
2	10005	POL029	RIB_ISK_0006	nigrum	Ben Connan	500	GBR	http://www.ribes-...
3	10006	POL029	RIB_ISK_0007	nigrum	Ben Lomond	500	GBR	http://www.ribes-...
4	10007	POL029	RIB_ISK_0008	nigrum	Ben Nevis	500	GBR	
5	10008	POL029	RIB_ISK_0009	nigrum	Ben Sarek	500	GBR	http://www.ribes-...
6	10009	POL029	RIB_ISK_0010	nigrum	Ben Tirran	500	GBR	http://www.ribes-...
7	10017	POL029	RIB_ISK_0018	nigrum	Bona	500	POL	
8	10021	POL029	RIB_ISK_0023	nigrum	Ceres	500	POL	
9	10024	POL029	RIB_ISK_0026	nigrum	Consort	500	CAN	
10	10027	POL029	RIB_ISK_0029	nigrum	Chereshniova	500	UKR	http://www.ribes-...

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DB number:
SPECIES:
Country of origin:
Holding institute:
Status of sample:
Search for (part of) the accession name: Mortti
Search for (part of) the accession number:
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Order

Order results by: Species Institute Country of origin Accession name Accession number

Order direction: Ascending Descending

Search Clear fields

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Page 1 of 1 Displaying records 1 - 3 of 3

	ID	Holding institute	Accession number	Species	Accession name	Sample status	Country of origin	Research data
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2	12190	FIN016	Ri 569	nigrum	Mortti	500	FIN	http://www.ribes-...
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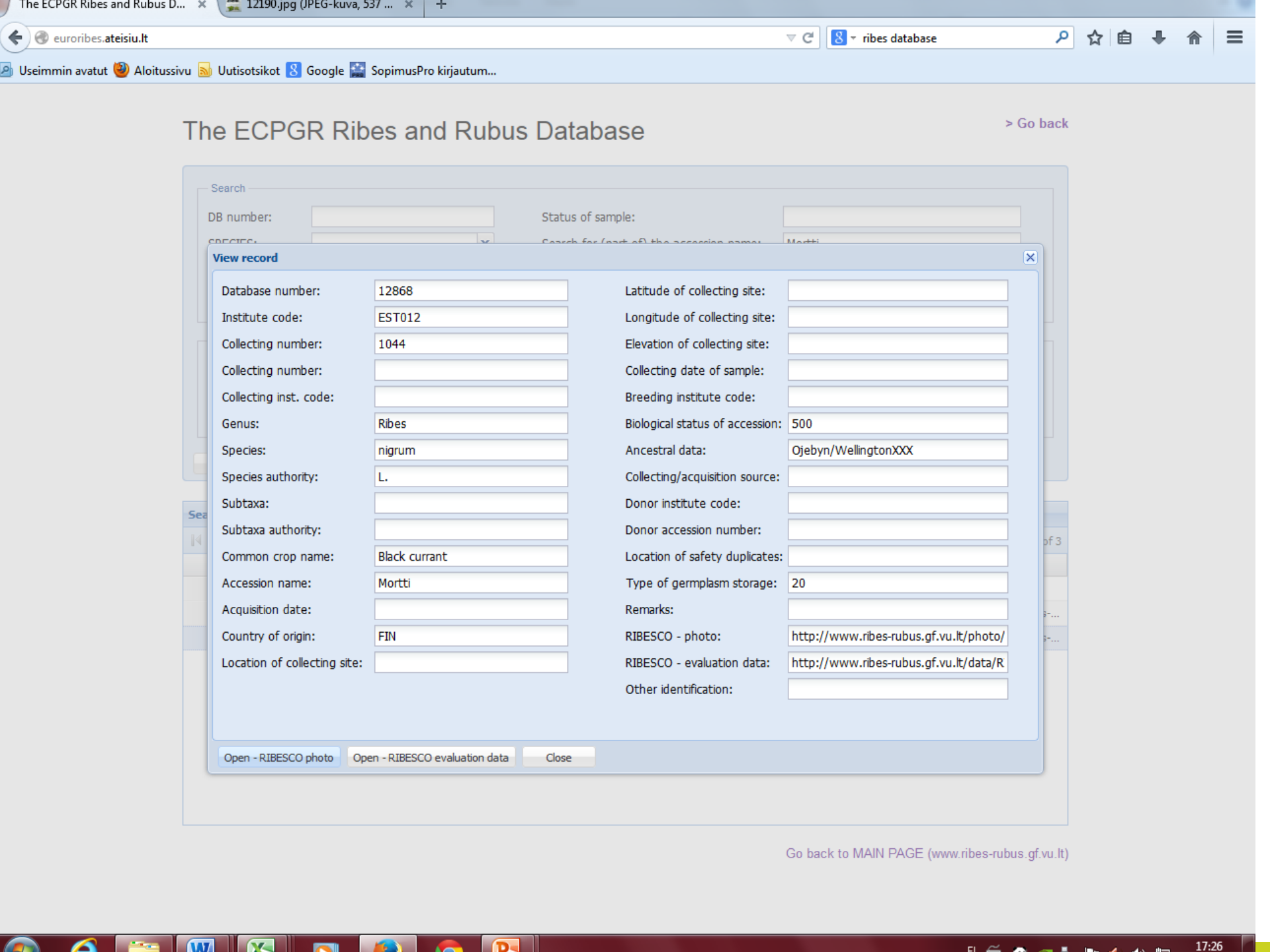
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The ECPGR Ribes and Rubus Database
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Search
DB number:
Status of sample:
View record
Database number: 12868
Institute code: EST012
Collecting number: 1044
Collecting number:
Collecting inst. code:
Genus: Ribes
Species: nigrum
Species authority: L.
Subtaxa:
Subtaxa authority:
Common crop name: Black currant
Accession name: Mortti
Acquisition date:
Country of origin: FIN
Location of collecting site:
Latitude of collecting site:
Longitude of collecting site:
Elevation of collecting site:
Collecting date of sample:
Breeding institute code:
Biological status of accession: 500
Ancestral data: Ojebyn/WellingtonXXX
Collecting/acquisition source:
Donor institute code:
Donor accession number:
Location of safety duplicates:
Type of germplasm storage: 20
Remarks:
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RIBESCO - evaluation data: http://www.ribes-rubus.gf.vu.lt/data/R
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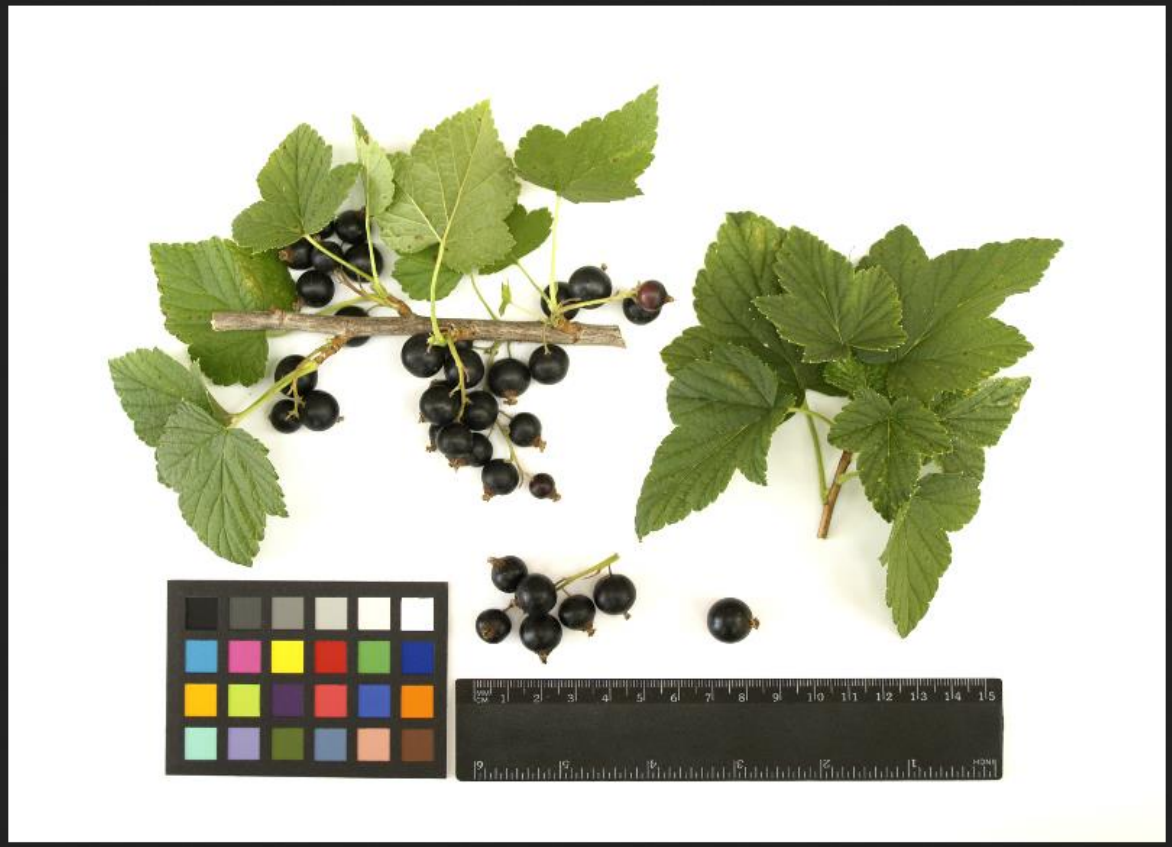

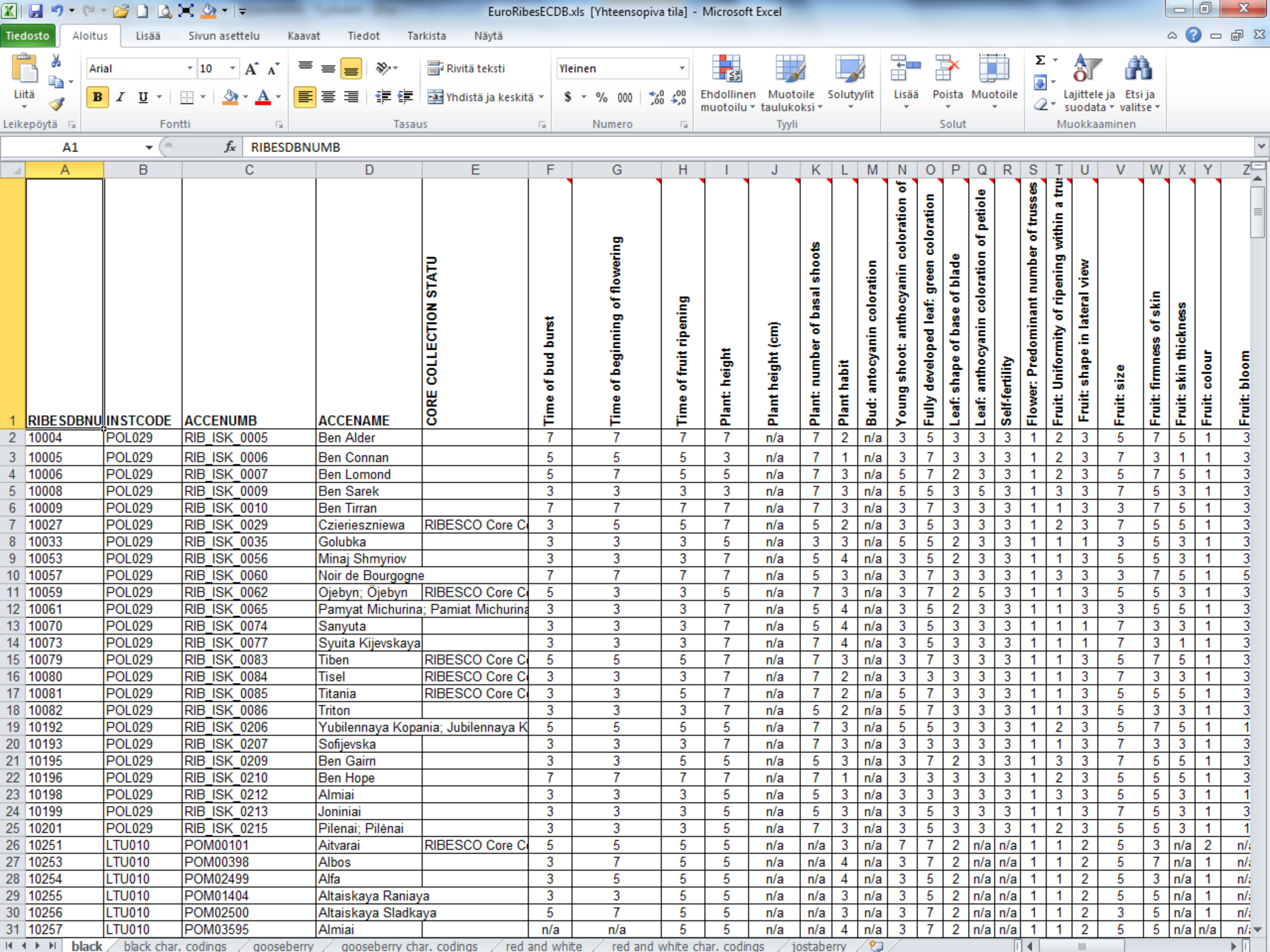

EuroRibesECDB.xls [Yhteensopiva tila] - Microsoft Excel

Tiedosto Aloitus Lisää Sivun asettelu Kaavat Tiedot Tarkista Näytä

Liitä Leikepöytä Arial 10 Fontti Rivitä teksti Yhdistä ja keskitä Tasaus Yleinen Numero Ehdollinen muotoilu Muotoile taulukoksi Solutyylit Tyyli Lisää Poista Muotoile Solut Lajittele ja suodata Etsi ja valitse Muokkaaminen

A1 RIBESDBNUMB

RIBESDBNU	INSTCODE	ACCENUMB	ACCENAME	CORE COLLECTION STATU	Time of bud burst	Time of beginning of flowering	Time of fruit ripening	Plant: height	Plant height (cm)	Plant: number of basal shoots	Plant habit	Bud: antocyanin coloration	Young shoot: anthocyanin coloration of	Fully developed leaf: green coloration	Leaf: shape of base of blade	Leaf: anthocyanin coloration of petiole	Self-fertility	Flower: Predominant number of trusses	Fruit: Uniformity of ripening within a tru	Fruit: shape in lateral view	Fruit: size	Fruit: firmness of skin	Fruit: skin thickness	Fruit: colour	Fruit: bloom
10004	POL029	RIB_ISK_0005	Ben Alder		7	7	7	7	n/a	7	2	n/a	3	5	3	3	3	1	2	3	5	7	5	1	3
10005	POL029	RIB_ISK_0006	Ben Connan		5	5	5	3	n/a	7	1	n/a	3	7	3	3	3	1	2	3	7	3	1	1	3
10006	POL029	RIB_ISK_0007	Ben Lomond		5	7	5	5	n/a	7	3	n/a	5	7	2	3	3	1	2	3	5	7	5	1	3
10008	POL029	RIB_ISK_0009	Ben Sarek		3	3	3	3	n/a	7	3	n/a	5	5	3	5	3	1	3	3	7	5	3	1	3
10009	POL029	RIB_ISK_0010	Ben Tirran		7	7	7	7	n/a	7	3	n/a	3	7	3	3	3	1	1	3	3	7	5	1	3
10027	POL029	RIB_ISK_0029	Czieriesznie wa	RIBESCO Core C	3	5	5	7	n/a	5	2	n/a	3	5	3	3	3	1	2	3	7	5	5	1	3
10033	POL029	RIB_ISK_0035	Golubka		3	3	3	5	n/a	3	3	n/a	5	5	2	3	3	1	1	1	3	5	3	1	3
10053	POL029	RIB_ISK_0056	Minaj Shmyriov		3	3	3	7	n/a	5	4	n/a	3	5	2	3	3	1	1	3	5	5	3	1	3
10057	POL029	RIB_ISK_0060	Noir de Bourgogne		7	7	7	7	n/a	5	3	n/a	3	7	3	3	3	1	3	3	3	7	5	1	5
10059	POL029	RIB_ISK_0062	Ojebyn; Öjebyn	RIBESCO Core C	5	3	3	5	n/a	7	3	n/a	3	7	2	5	3	1	1	3	5	5	3	1	3
10061	POL029	RIB_ISK_0065	Pamyat Michurina; Pamiat Michurina		3	3	3	7	n/a	5	4	n/a	3	5	2	3	3	1	1	3	3	5	5	1	3
10070	POL029	RIB_ISK_0074	Sanyuta		3	3	3	7	n/a	5	4	n/a	3	5	3	3	3	1	1	1	7	3	3	1	3
10073	POL029	RIB_ISK_0077	Syuita Kijevskaya		3	3	3	7	n/a	7	4	n/a	3	5	3	3	3	1	1	1	7	3	1	1	3
10079	POL029	RIB_ISK_0083	Tiben	RIBESCO Core C	5	5	5	7	n/a	7	3	n/a	3	7	3	3	3	1	1	3	5	7	5	1	3
10080	POL029	RIB_ISK_0084	Tisel	RIBESCO Core C	3	3	3	7	n/a	7	2	n/a	3	3	3	3	3	1	1	3	7	3	3	1	3
10081	POL029	RIB_ISK_0085	Titania	RIBESCO Core C	3	3	5	7	n/a	7	2	n/a	5	7	3	3	3	1	1	3	5	5	5	1	3
10082	POL029	RIB_ISK_0086	Triton		3	3	3	7	n/a	5	2	n/a	5	7	3	3	3	1	1	3	5	3	3	1	3
10192	POL029	RIB_ISK_0206	Yubilennaya Kopania; Jubilennaya K		5	5	5	5	n/a	7	3	n/a	5	5	3	3	3	1	2	3	5	7	5	1	1
10193	POL029	RIB_ISK_0207	Sofijevska		3	3	3	7	n/a	7	3	n/a	3	3	3	3	3	1	1	3	7	3	3	1	3
10195	POL029	RIB_ISK_0209	Ben Gairn		3	3	5	5	n/a	5	3	n/a	3	7	2	3	3	1	3	3	7	5	5	1	3
10196	POL029	RIB_ISK_0210	Ben Hope		7	7	7	7	n/a	7	1	n/a	3	3	3	3	3	1	2	3	5	5	5	1	3
10198	POL029	RIB_ISK_0212	Almiai		3	3	3	5	n/a	5	3	n/a	3	3	3	3	3	1	3	3	5	5	3	1	1
10199	POL029	RIB_ISK_0213	Joniniai		3	3	3	5	n/a	5	3	n/a	3	5	3	3	3	1	1	3	7	5	3	1	3
10201	POL029	RIB_ISK_0215	Pilenai; Pilėnai		3	3	3	5	n/a	7	3	n/a	3	5	3	3	3	1	2	3	5	5	3	1	1
10251	LTU010	POM00101	Aitvarai	RIBESCO Core C	5	5	5	5	n/a	n/a	3	n/a	7	7	2	n/a	n/a	1	1	2	5	3	n/a	2	n/
10253	LTU010	POM00398	Albos		3	7	5	5	n/a	n/a	4	n/a	3	7	2	n/a	n/a	1	1	2	5	7	n/a	1	n/
10254	LTU010	POM02499	Alfa		3	5	5	5	n/a	n/a	4	n/a	3	5	2	n/a	n/a	1	1	2	5	3	n/a	1	n/
10255	LTU010	POM01404	Altaiskaya Raniaya		3	3	5	5	n/a	n/a	3	n/a	3	5	2	n/a	n/a	1	1	2	5	5	n/a	1	n/
10256	LTU010	POM02500	Altaiskaya Sladkaya		5	7	5	5	n/a	n/a	3	n/a	3	7	2	n/a	n/a	1	1	2	3	5	n/a	1	n/
10257	LTU010	POM03595	Almiai		n/a	n/a	5	5	n/a	n/a	4	n/a	3	7	2	n/a	n/a	1	1	2	5	5	n/a	n/a	n/

black | black char. codings | gooseberry | gooseberry char. codings | red and white | red and white char. codings | jostaberry

Sub-Task 1.1.1 Data mining of existing characterisation data

- To identify accessions with valuable traits
- Mainly by SAS procedures
- High variability between accessions
- Mainly very low correlations between traits (PCA was not used), some interesting ones
- Same varieties have given rather different results in different test sites

Combining the observation values of specific traits:

- Environmental adaptability (Phenology)
- Pest and disease resistance
- Yield components (Attracting fresh fruit quality, Health-promoting, Productive)

Black currant varieties in

- Central Europe (Germany, Poland)
- Northern Europe (Finland, Sweden, Estonia, Latvia, Lithuania)

Results

Late bud break, late flowering
- to escape spring frosts

ACCENAME	REGION	INSTCODE
Nieosypajuszczajasja	N	SWE013
Noir de Bourgonge	N	SWE013
Black of Naples x 14+6+7145	N	LVA015
Ben Hope	N	SWE013
F1(2) R.bract x R.pet.	N	LVA015
Keep39 x R.pet. x R.dik.	N	LVA015
Titania	N	SWE013
Ben Gairn	N	SWE013
Storklas	N	SWE013
Mite Free	N	SWE013
Rosenthals Schwartze	N	LVA015
9 x Nayadnaya 79	N	LVA015

Berry development in short time - late flowering, early ripening

ACCENAME	REGION	INSTCODE
Nieosypajuszczajasja	N	SWE013
Titania	N	SWE013
Black Prince	N	SWE013
F4/1/67	N	SWE013
Junost	N	SWE013
Jadrenaya	N	LTU006
2212N	N	SWE013
Svyria	N	SWE013
Søbackgaard	N	SWE013
De Gröna	N	SWE013
Dubingiai	N	LTU010
Dizhonskaya	N	LTU010
Finnskoga Druva	N	SWE013
Black of Naples x 14+6+7145	N	LVA015
Noir de Bourgonge	N	SWE013
AP-71 12-132	N	LVA015
Favorskaya	N	LTU010
Zimushka	N	LTU010
Belorusskaya Sladkaya	N	LTU010
Fertödi 1	N	LTU010
Amos Black	N	LVA015

ACCENAME	REGION	INSTCODE
1125N	N	SWE013
2212N	N	SWE013
6-26-115	N	LVA015
675/10	N	LVA015
Black Prince	N	SWE013
Bona	N	EST012
De Gröna	N	SWE013
Golubichka	N	LVA015
Izyumnaya	N	LVA015
Jadrenaya	N	LTU006
Junskaja Kontratšovoi	N	EST012
Naslednitsa	N	EST012
No. 29 (R.pet. x R.dik.)	N	LVA015
No. 4 intersp.	N	LVA015
No. 5 intersp.	N	LVA015
No. 675/10	N	LVA015
R. dikuscha	N	SWE013
R. dikuscha	N	LVA015
Sejanets Golubki	N	EST012
Selechenskaya	N	LVA015
Sevchanka	N	LVA015
Svyria	N	SWE013
Søbackgaard	N	SWE013
Varmas	N	LVA015
Varmas	N	EST012
Vertti	N	LVA015
Viuchiai	N	LVA015
Wusil	C	DEU610

Early croppig

Late cropping

ACCENAME	REGION	INSTCODE
1600-luvun herukka	N	FIN016
5r44	N	LVA015
8704-1	N	LVA015
8709-42	N	LVA015
9 x Nayadnaya 79	N	LVA015
Ben Hope	N	SWE013
E-170	N	LVA015
F1(2) R.bract x R.pet.	N	LVA015
Kazachka	N	LVA015
No. 1297	N	LVA015
R. sanguineum	N	LVA015
Rosenthals Schwartze	N	LVA015
Sina	C	DEU610
Westra	C	DEU610
Yadrenaya	N	LVA015

Resistance to pests and diseases

Susceptibility to

- Powdery mildew
- Black currant reversion virus
- Septoria leaf spot
- Leafspot, Anthracnose
- Blister rust
- Grey mould
- Gall mites
- Two spotted spider mites

- Variability and varying scale of scores in different test sites
- Average of all pest and disease observations (at least 2)
- Best 10% of each collection

ACCENAME	REGION	INSTCODE
24-4	N	LVA015
1/74-32	N	SWE013
1600-luvun herukka	N	FIN016
19G 15 r.	N	LVA015
675/10	N	LVA015
Aitvarai	N	LTU010
Albos	N	LTU010
Alfa	N	LTU010
Almiai	N	LTU010
Almiai	N	LTU006
Altaiskaya Raniaya	N	LTU010
AP-71 12-132	N	LVA015
Argut	N	LTU010
Belorusskaya Sladkaya	N	LTU010
Ben Alder	N	SWE013
Ben Avon	N	EST012
Ben Connan	N	EST012
Ben Connan	C	POL029
Ben Dorain	N	EST012
Ben Kilbreck	N	EST012
Ben Starav	N	EST012
Bija	N	SWE013
Biya	N	LTU010
Bona	N	EST012
BRi 9502-1A	N	LTU006
BRi 9508-1A	N	LTU006
BRi 9508-2A	N	LTU006
BRi 9508-2B	N	LTU006
BRi 9508-3A	N	LTU006
BRi 9508-3B	N	LTU006
BRi 9508-3C	N	LTU006
BRi 9538-1	N	LTU006
BRi 9568-1A	N	LTU006
Ceres	N	EST012
Chernaya Vual'	N	LVA015

ACCENAME	REGION	INSTCODE
Consort	C	POL029
De Gröna	N	SWE013
Dochka	N	LTU006
Dringiai	N	LTU010
Druksiai	N	LTU010
Elo	N	EST012
Ershistaya	N	LTU010
F4/1/67	N	SWE013
Farleigh	N	EST012
Favorskaya	N	LTU010
Foxentown	N	EST012
Gofert	C	POL029
Haakon	N	FIN016
Kajaanin Musta	N	LTU010
Kantata – 50	N	LTU010
Katun	N	LTU010
Katyusha	N	EST012
Katyusha	N	LTU010
Katyusha	N	LVA015
Klavdija	N	LTU010
Klusonovskaya	N	LTU010
Kolchoznaya	N	LTU010
Kosmicheskaya	N	LTU010
Kristin	N	FIN016
Lakajai	N	LTU010
Lepaan Valio	N	LTU010
Likernaya	N	LTU010
Minaj Shmyriov	N	LTU010
No. 1297	N	LVA015
No. 2255	N	LVA015
No. 5 intersp.	N	LVA015
No. 61	N	LVA015
No. 7727	N	LVA015
Nr. 7/13	N	EST012
Ola	N	EST012

ACCENAME	REGION	INSTCODE
Ores	N	EST012
Ores	C	POL029
Orlovka	N	LTU010
Orse	N	LVA015
P8-5-24	N	SWE013
Pamyat Vavilova	N	LTU010
Partizanka	N	LTU010
Paulinka	N	LTU010
Perapohjolan Musta	N	LTU010
Pilot Aleksandr Mamkin	N	LVA015
Pilot Aleksandr Mamkin	N	LTU010
Poezija	N	LTU006
Polli Pikk – kobar	N	LTU010
Prikarpatskaya	N	LTU010
Ruben	C	POL029
Rus	N	LTU010
Sachalevskaya	N	LTU010
Sakalai	N	LTU010
Sina	C	DEU610
Stirniai	N	LTU010
Storklas	N	SWE013
Storklas	N	LTU006
Titania	N	LTU010
Titania	N	LTU006
Topach	N	LTU010
Ulybka	N	LTU010
Ussuri	N	LVA015
Vestra	N	LTU010
Wiwa	C	DEU610
Vologda	N	LTU010
Voshod	N	LTU010
Zeruciai	N	LTU010
Zimushka	N	LTU010
Åstrom	N	LTU010
Åström	N	SWE013
Östersund	N	SWE013

Berry quality

Long trusses, uniform ripening, big berries

ACCENAME	REGION	INSTCODE
Almo	N	EST012
Buraja	N	EST012
Chereshneva	N	LVA015
Chernii Zhemchug	N	LVA015
Czereszniewa	C	POL029
Ekzotika	N	LVA015
Intercontinental	N	SWE013
Kantata	N	EST012
Karri	N	EST012
Katyusha	N	LVA015
Lentyai	N	LVA015
Mara	N	LVA015
No. 95	N	LVA015
Poezija	N	LVA015
Rosenthals Langtraubige Schwarze	C	DEU610
Silvergieters Schwarze	C	DEU610
Tambovskaja	N	EST012
Triton	N	EST012
Wusil	C	DEU610

High sugar:acid ratio

ACCENAME	REGION	INSTCODE
Nr.7751	N	LVA015
Black of Naples x 14+6+7145	N	LVA015
6-26-115	N	LVA015
Izyumnaya	N	LVA015
Amos Black	N	LVA015
Elo	N	EST012
Erkheikki	N	LTU006
Selechenskaya	N	LVA015
Rachkovskaja	N	LTU006
Almiai	N	LTU006
97-A112	N	LVA015
Karri	N	EST012
Gagatai	N	LTU006
Almo	N	EST012

High anthocyanins, High vitamin C

ACCENAME	REGION	INSTCODE
O438A	N	SWE013
Mite Free	N	SWE013
Bialoruskaja Slodkaja	N	SWE013
Mammouth	N	SWE013
Noir de Bourgonge	N	SWE013
F4/1/67	N	SWE013
Ben Hope	N	SWE013
1/74-32	N	SWE013
Ben Gairn	N	SWE013
Thinker	N	SWE013
Kings Acre Baldwin	N	SWE013
Poesia	N	SWE013
Binar	N	SWE013
Ben Alder	N	SWE013
Poeziya	N	SWE013
Rosenthals Langtraubige	N	LVA015
Jadrenaja	N	SWE013
Minaj Szmyriev	N	SWE013
R. dikuscha	N	SWE013
5r44	N	LVA015
I a 58	N	LVA015
D16/1/25	N	SWE013
Nieosypajuszczajasja	N	SWE013
Detskosel'skaya	N	LVA015
II b 14	N	LVA015
Vakariai	N	LVA015
1125N	N	SWE013
Ri428 x Golubka	N	SWE013
Docz Sibiriaczki	N	SWE013
Polar	N	SWE013
Bagera	N	SWE013
Titania	N	EST012
Dikovinka	N	SWE013

High anthocyanins

ACCENAME	REGION	INSTCODE
Triton	N	SWE013
Risarp	N	SWE013
Hietala	N	FIN016
Polar	N	EST012
Titania	N	SWE013
Nikkala	N	FIN016
Kajaanin musta	N	EST012
Boskoopin Jätti	N	FIN016
Ceres	N	EST012
BRi 8315-25	N	SWE013

High vitamin C

ACCENAME	REGION	INSTCODE
Viherherukka 1 Renko	N	FIN016
Viherherukka 2 Renko	N	FIN016
Lanxton Tinker	C	LTU006
(Venla) Venny	N	FIN016
Katiusha	C	LTU006
Tisel	C	POL029

High yield, big berries

ACCENAME	REGION	INSTCODE
Almo	N	EST012
Ben Sarek	N	EST012
Blizgiai	N	EST012
Bona	N	EST012
Intercontinental	C	DEU610
Jadernaja	N	EST012
Katjuša	N	EST012
Mara	N	EST012
Polar	N	EST012
Tambovskaja		
Varmas		
Yadrenaya		
Zeljonaja Dyr		

Big berries, high sugar

ACCENAME	REGION	INSTCODE
Ben Avon	N	EST012
PC – 1	N	EST012
Poezja	C	POL029
Ruben	C	POL029
Sanjuta	C	POL029
Sjuta Kijewskaja	C	POL029
Sofijewskaja	C	POL029
Szachalewskaja	C	POL029
Tiben	C	POL029
Tines	C	POL029
Tisel	C	POL029
Titania	C	POL029
Triton	C	POL029

High yield, big berries, high sugar

ACCENAME	REGION	INSTCODE
Almo	N	EST012
Bona	N	EST012
Brödtorp	N	LTU010
Intercontinental	C	DEU610
Klusonovskaya	N	LTU010
Lentaj	C	POL029
Mara	N	EST012
PC – 1	N	EST012
Ruben	C	POL029
Sanjuta	C	POL029
Seyanec Golubki	N	LTU010
Sjuta Kijewskaja	C	POL029
Sofijewskaja	C	POL029
Tambovskaja	N	EST012
Tines	C	POL029
Tisel	C	POL029
Titania	C	POL029
Varmas	N	EST012

- Possibilities to breeders and berry industry to access and use the data of genetic resources

- Possibilities to breeders and berry industry to access and use the plant material of genetic resources