EVALUATION OF WINTER HARDINESS AND PRODUCTIVITY OF HIGHBUSH BLUEBERRY CULTIVARS IN LATVIA

Dace Sterne, Marta Liepniece, Mintauts Abolins, Rudite Sausserde, Biruta Grinberga

Latvia University of Agriculture, Institute of Agrobiotechnology,
Liela iela 2, Jelgava, Latvia

Why blueberries?

- Latvia is located between the Northern latitudes 55º and 58º - out of traditional blueberries (*Vaccinium corymbosum* L.) growing areas (between 40° and 45°), but during the last 15 years blueberries are some of the most popular berries grown in Latvia.
- Blueberry is one of the richest sources of polyphenolic antioxidant compounds that have important role in human health.
- Blueberry is very tasty

There are 3 main types of blueberries grown in Latvia:

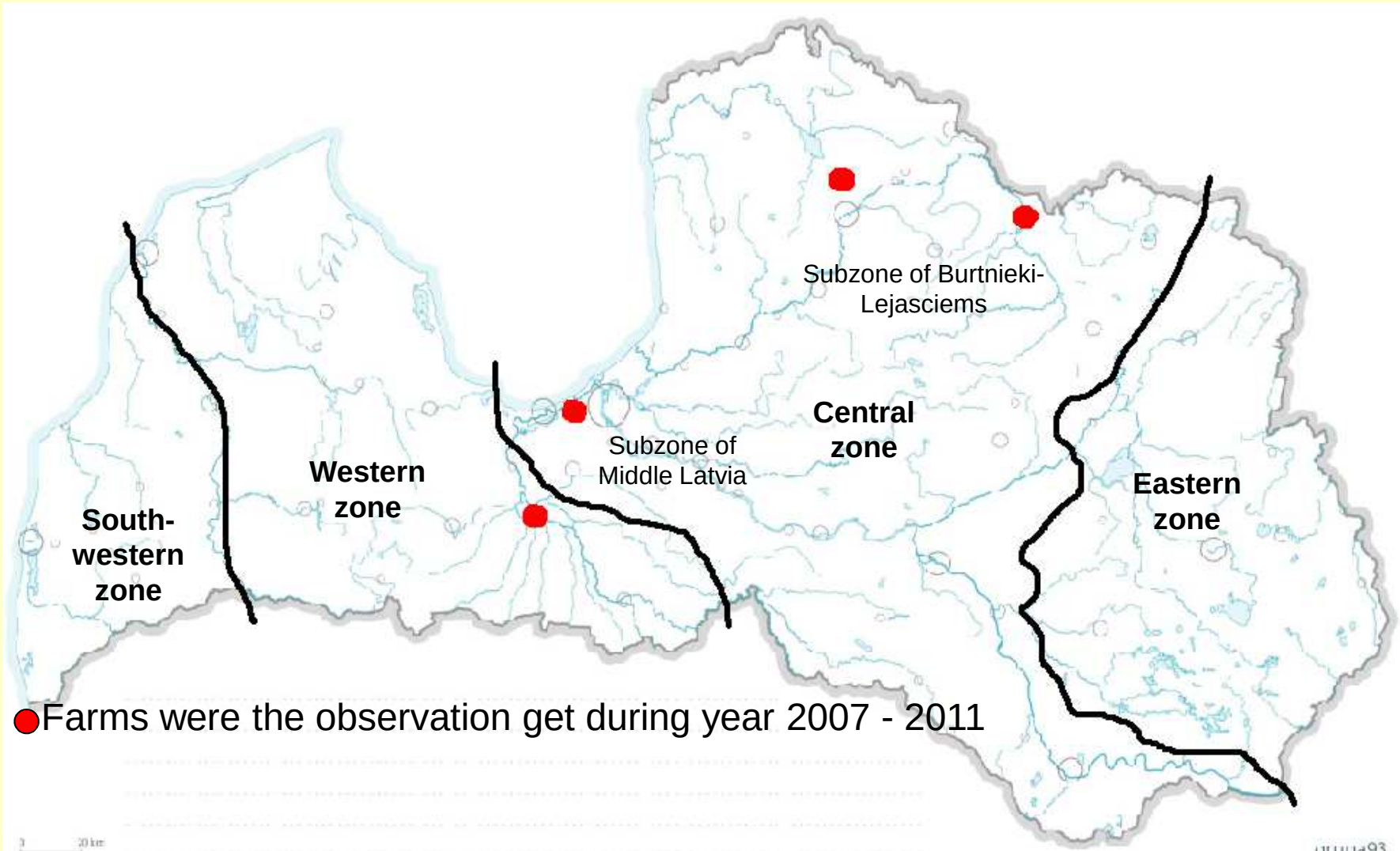
- **Northern highbush blueberries** (*Vaccinium corymbosum* L.)
- **Half-high blueberries** (*V. corymbosum* L. × *V. angustifolium* Ait.)
- **Lowbush blueberries** *(V. angustifolium* Ait.)

The aim of this study was to evaluate highbush and half-high blueberry cultivation possibilities in Latvia conditions.

Materials and Methods

- Experimental date was collected from 2007 to 2011
- During the observation periods were evaluate the blueberry cultivars from the four blueberries' farm at the two fruit-growing zones and three subzones
- In three farms the blueberry plants were planted in mineral soil that filled with peat
- In one farm the blueberry plants were planted in peat bog

Fruit-growing zones of Latvia (Karklins, 1972)



Materials and Methods

13 blueberry cultivars were studied:

V. corymbosum:

- Duke
- Spartan
- Patriot
- Bluejay
- Blueray
- Bluecrop
- Jersey
- Brigitta
- Chandler

V. corymbosum L. × *V. angustifolium* Ait.:

- Northland
- Northblue
- Chippewa
- Polaris

Materials and Methods

Was determined **winter hardiness** - using a ten-point scale:

0 point – plant are died,

1 point – very low winter hardiness, all branches damaged up to the soil level,

6 point – medium winter hardiness, damaged one-year old branches and 21 – 40% flower bud,

9 point – very high winter hardiness, branches not damaged.

The cultivars were separate in four hardiness group: low (<4 point), medium (4.1 to 6 point), medium high (6.1 to 7.5 point), high (> 7.5 point)

Yield potential: low – medium – medium high – high

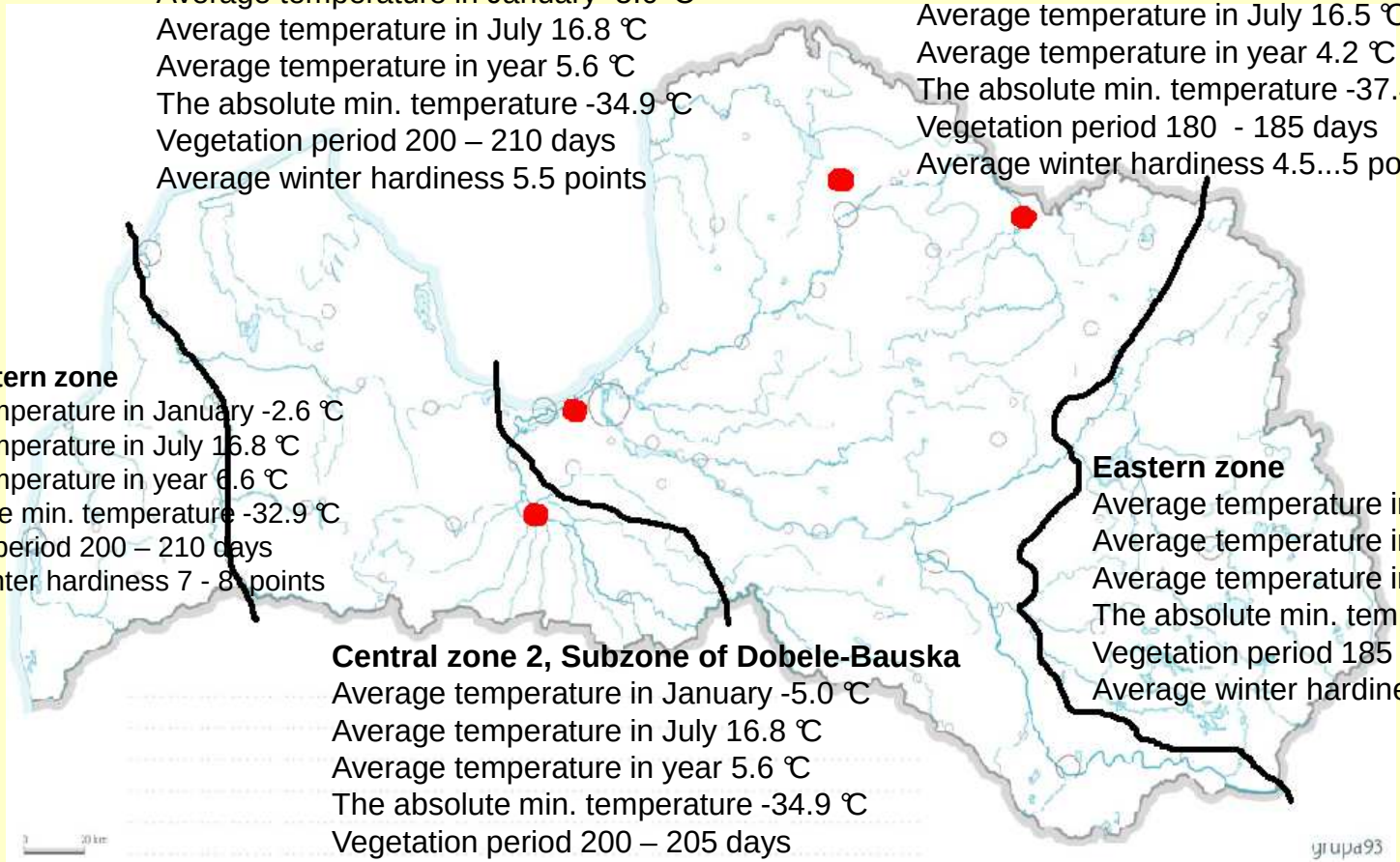
Berry weight: small – medium – medium high – high

Berry size: small – medium – medium large – large

Climate in the fruit-growing zones, (Karklins, 1972)

Central zone 1, Subzone of Middle Latvia
Average temperature in January -5.0 ℃
Average temperature in July 16.8 ℃
Average temperature in year 5.6 ℃
The absolute min. temperature -34.9 ℃
Vegetation period 200 – 210 days
Average winter hardiness 5.5 points

Central zone 3, Subzone of Burtnieki-Lejasciems
Average temperature in January -7.5 ℃
Average temperature in July 16.5 ℃
Average temperature in year 4.2 ℃
The absolute min. temperature -37.4 ℃
Vegetation period 180 - 185 days
Average winter hardiness 4.5...5 points



South-western zone
Average temperature in January -2.6 ℃
Average temperature in July 16.8 ℃
Average temperature in year 6.6 ℃
The absolute min. temperature -32.9 ℃
Vegetation period 200 – 210 days
Average winter hardiness 7 - 8 points

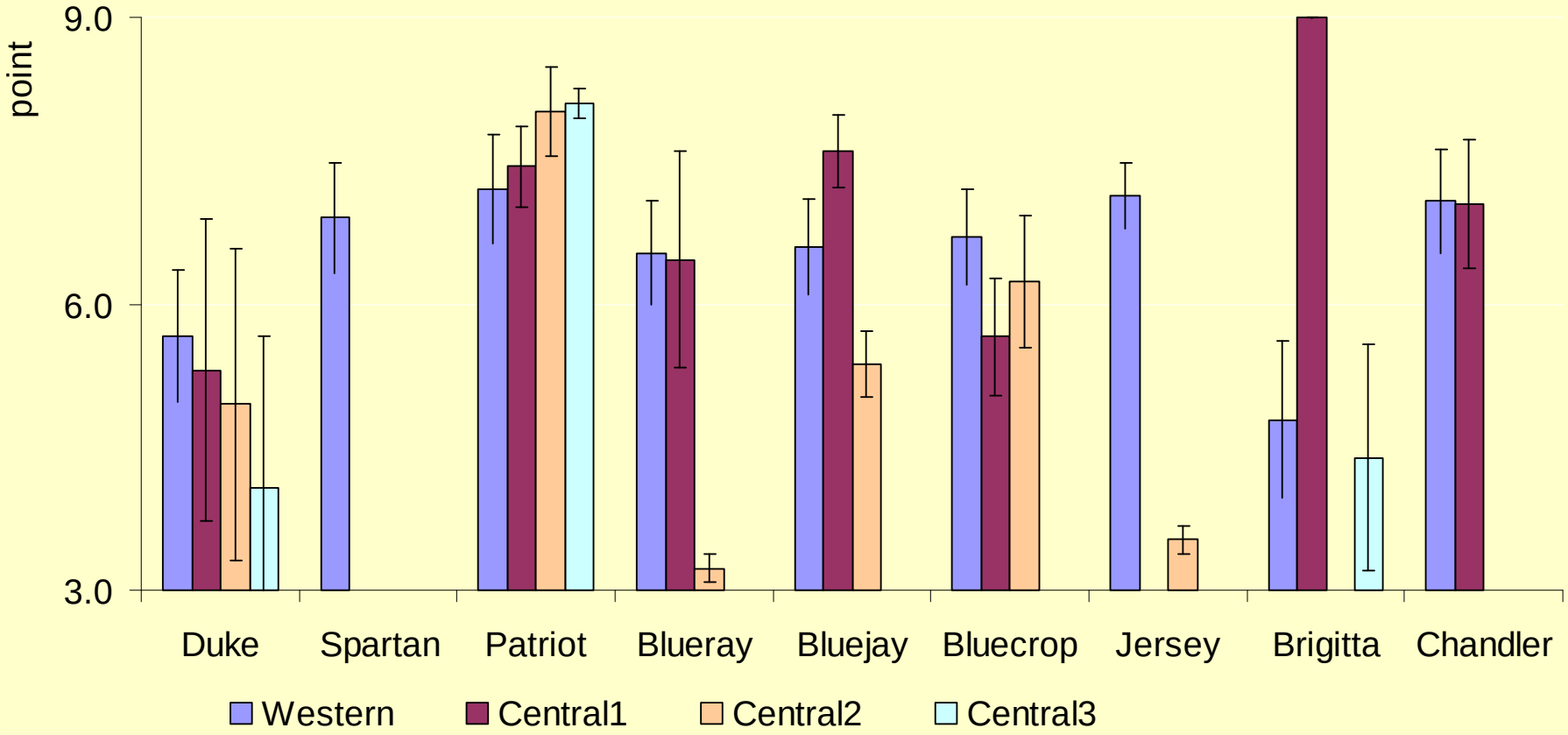
Central zone 2, Subzone of Dobele-Bauska
Average temperature in January -5.0 ℃
Average temperature in July 16.8 ℃
Average temperature in year 5.6 ℃
The absolute min. temperature -34.9 ℃
Vegetation period 200 – 205 days
Average winter hardiness 5.5 points

Eastern zone
Average temperature in January -6.6 ℃
Average temperature in July 17.6 ℃
Average temperature in year 5.4 ℃
The absolute min. temperature -43.2 ℃
Vegetation period 185 - 195 days
Average winter hardiness 3.5....4.5 points

Results

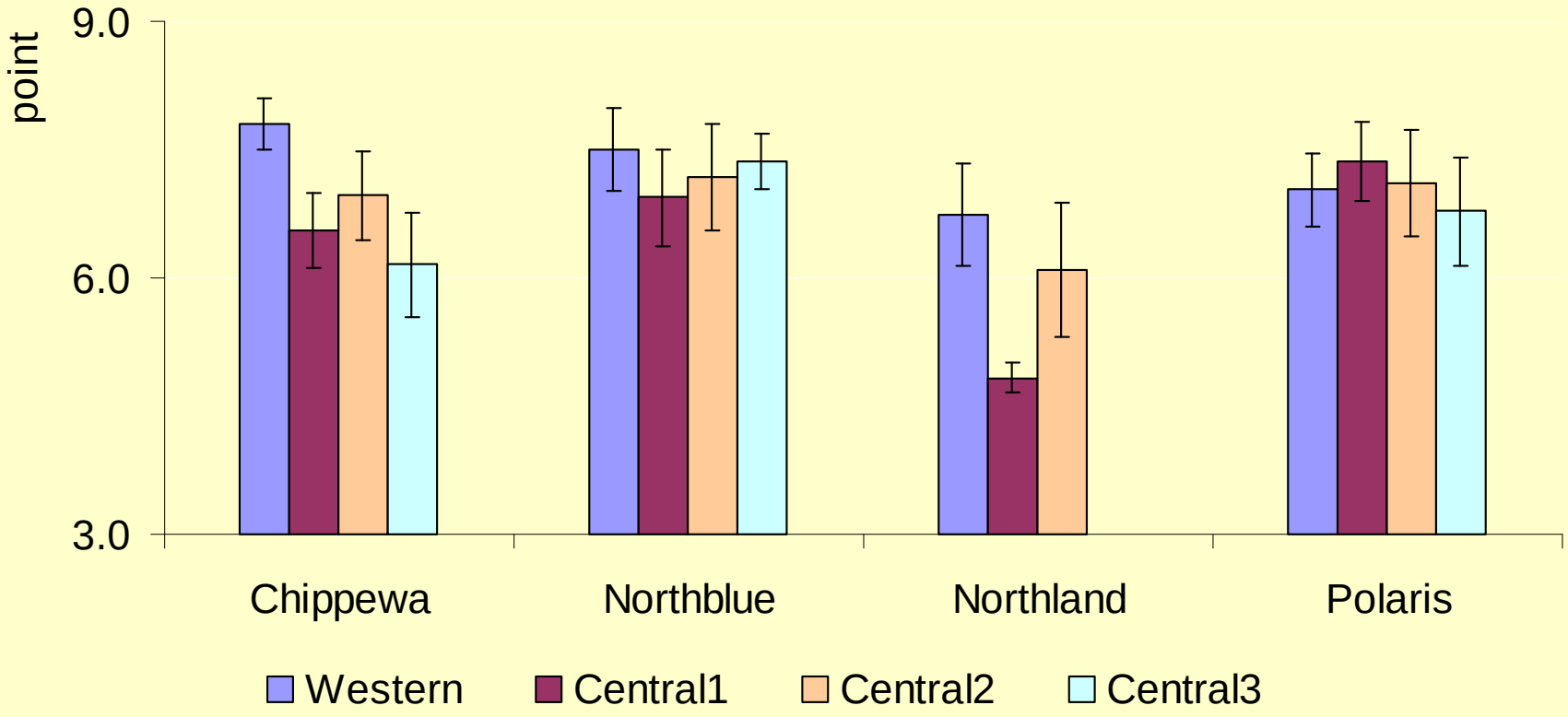
Average winter hardiness (point) during period 2007 – 2011

V. corymbosum



Average winter hardiness (point) during period 2007 – 2011

V.corymbosum × *V. angustifolium*



Winter hardiness in photos

Mineral soil

Peat bog

Year 2007, Central zone,
Subzone of Burtnieki-Lejasciems

Winter hardiness in photos

Mineral soil

Year 2007, Estern zone

Winter hardiness in photos

Year 2010, Central zone, Subzone of Burtnieki-Lejasciems,

Peat bog

Winter hardiness

Cultivar	Hardiness	Recomended growing zones		
		Western	Central 1/ Central 2	Central 3
Brigitta	**low**	X	-	-
Duke	**low**	X	-	-
Bluejay	meduim	X	X	-
Blueray	meduim	X	X	-
Bluecrop	meduim	X	X	-
Chandler	medium high	X	X	-
Jersey	medium high	X	X	-
Patriot	medium high	X	X	X
Spartan	medium high	X	X	-

Winter hardiness

Cultivar	Hardiness	Recomended growing zones		
		Western	Central 1/ Central 2	Central 3
Polaris*	medium high	X	X	X
Chippewa*	high	X	X	X
Northblue*	high	X	X	X
Northland*	high	X	X	X

** V. corymbosum × V. angustifolium*

Short characteristic of yield, berry weight, berry size of the blueberries

Cultivar	Yield potential	Berry weight	Berry size	Note
Bluecrop	medium to high	medium high	medium large	Plants tends to overproduce if not pruned correctly
Bluejay	medium high	medium	medium	
Blueray	medium high	medium to medium high	medium	
Brigitta	low to medium	medium high	medium large	Yield varies from field to field and year to year
Chandler	medium	high	large to very large	Very long ripening season.
Duke	medium to high	high	medium large	Yield varies from field to field and year to year

Short characteristic of yield, berry weight, berry size of the blueberries

Cultivar	Yield potential	Berry weight	Berry size	Note
Jersey	medium	medium high	medium	
Patriot	high	medium high	medium large	Berry have a “red back” when immature, can have tight fruit clusters
Spartan	medium to high	medium high	medium	
Chippewa*	high	medium	medium	Plants tends to overproduce if not pruned correctly
Northblue*	medium	medium high	medium large	
Northland*	high	medium	medium	Many shoots
Polaris*	medium	medium	medium	

* *V. corymbosum* × *V. angustifolium*

Conclusion

- The highest winter hardiness was observed for half-high blueberry cultivars ‘Chippewa’, ‘Polaris’, ‘Northblue’, ‘Northland’ and highbush blueberry cultivar ‘Patriot’. The winter hardiness of blueberry cultivars depend of each year weather condition. High sense on weather condition showed cultivars ‘Duke’ and ‘Brigitta’

- High yield potential in all fruit-growing zones showed cultivars ‘Patriot’, ’Northland’, ‘Chippewa’

- Cultivar ‘Chandler’ have large to very large berry size but negative factor is they very long ripening period

- Results showed that northern highbush and half-high blueberry grew satisfactorily in Latvia weather conditions and we can recommend all experimental cultivars for home garden. Cultivars ‘Bluecrop’, ‘Chippewa’, ‘Northland’, ‘Northblue’, ‘Patriot’ and ‘Polaris’ are more suitable for commercial cultivation due to greater winter hardiness, yield and larger berry size.

ACKNOWLEDGEMENTS

- The research was supported by the Ministry of Agriculture in collaboration with Latvia State Institute of Fruit-growing.