

# Scots pine growth responses to environmental conditions in IUFRO 1982 series



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# Aims:

- To outline concept experimental series with Scots pine IUFRO 1982.
- Current status of the experiment
- Summarising available results
- Looking for the growth patterns in particular environmental conditions

# IUFRO 1982 - history

- At the IUFRO symposium „Genetics of Scots Pine in Kórnik the new provenance experiment was proposed – 1973. No interest in the idea at this time.
- In Oslo during 16th IURFO meeting S. Białobok and C. Mátyás returned to the proposal and it was accepted
- The suggestion was to collect seeds along two transects from north to south and from east to west (along longitude 20° E and 52 ° N latitude)
- Interest in the establishment of this experiment was not large (Giertych, Oleksyn 1992).

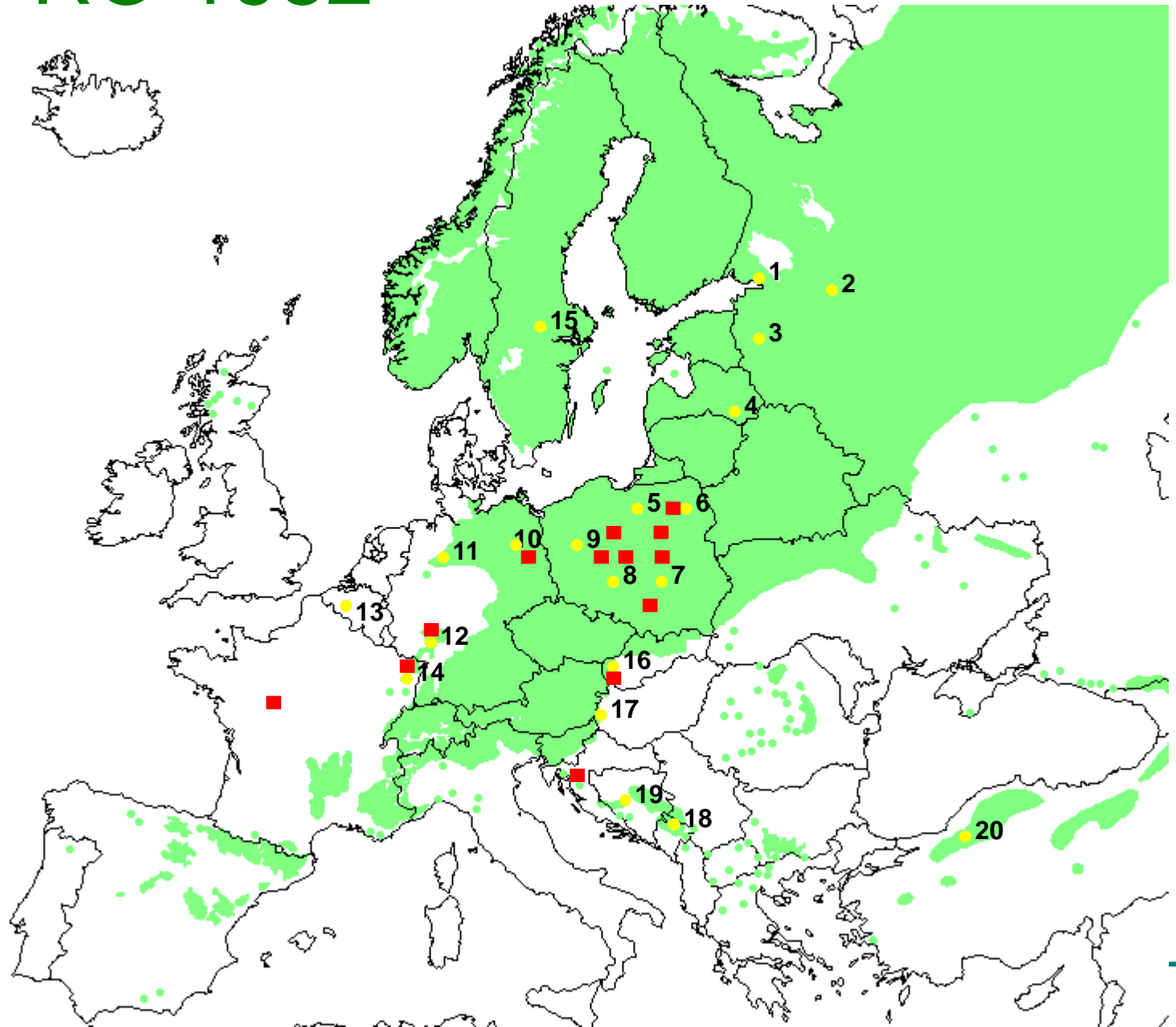
# Studied populations

Poulation	Latitude [°N]	Longitude [°E]	Altitude
1 Roščinskaja Dača	60° 15'	29° 54'	80
2 Kondežskoje	59° 58'	33° 30'	70
3 Serebrianskoje	58° 50'	29° 07'	80
4 Silene	55° 45'	26° 40'	165
5 Miłomłyn (Tabórz)	53° 34'	20° 00'	110
6 Supraśl	53° 12'	23° 22'	160
7 Spała	51° 37'	20° 12'	160
8 Rychtal	51° 08'	17° 55'	190
9 Bolewice	52° 24'	16° 03'	90
10 Neuhaus	53° 02'	13° 53'	40
11 Betzhorn	52° 30'	10° 30'	65
12 Lampertheim	49° 30'	8° 30'	97
13 Ardennes	50° 46'	4° 26'	110
14 Hagenau	48° 49'	7° 47'	157
15 Sumpberget	60° 11'	15° 52'	185
16 Zahorie	48° 46'	17° 03'	160
17 Pornóapáti	47° 20'	16° 28'	300
18 Maočnica	43° 10'	19° 30'	1200
19 Prusačka Rijeka	44° 06'	17° 21'	885
20 Çatacik	40° 00'	31° 10'	1400

# Experimental sites description

No	Locality	Lat (N)	Long (°E)	Altitude	Area ha	Year of planting	Seedlings age	Spacing	Last measurements
1	Wyszków	52,41	21,28	112	3,15	1984	2	1,5 x 1,8	2003
2	Sękocin	52,05	20,51	115	0,12	1984	2	1,5 x 1,0	2003
3	Popień	51,47	19,56	190	1,20	1984	2	1,5 x 1,5	2005
4	Supraśl	53,12	23,22	160	3,52	1984	2	1,5 x 1,5	2005
5	Kórnik	52,15	17,04	70	0,41	1984	2	1,5 x 0,5	2007
6	Niepołomice	50,02	20,22	195	0,29	1984	2	1,5 x 1,0	2007
7	Czapury	52,19	16,55	70	0,29	1990	2	1,5 x 1,2	2007
8	Haguenau	49,75	7,78	150	1,88	1990	3	3,0 x 1,5	200?
9	Lorris	47,90	2,35	129	1,45	1990	3	3,0 x 1,5	200?
10	Waldsieversdorf	52,55	14,09	50	2,80	1984	2	1,5 x 1,5	?
11	Waldsieversdorf	52,53	14,07	60	0,70	1984	2	1,5 x 0,5	?
12	Waldsieversdorf	52,53	14,07	60	0,70	1984	2	1,5 x 1,0	?
13	Bansheim	49,65	8,52	94	3,35	1986	3	1,5 x 1,1	1991
14	Drenovac	45,33	15,22	210	1,03	1985	3	2,0 x 2,0	1986
15	Lasek	48,35	17,08	250	1,55	1984	2	1,5 x 0,5	200?
16	Acsad	47,22	16,42	200				destroyed	

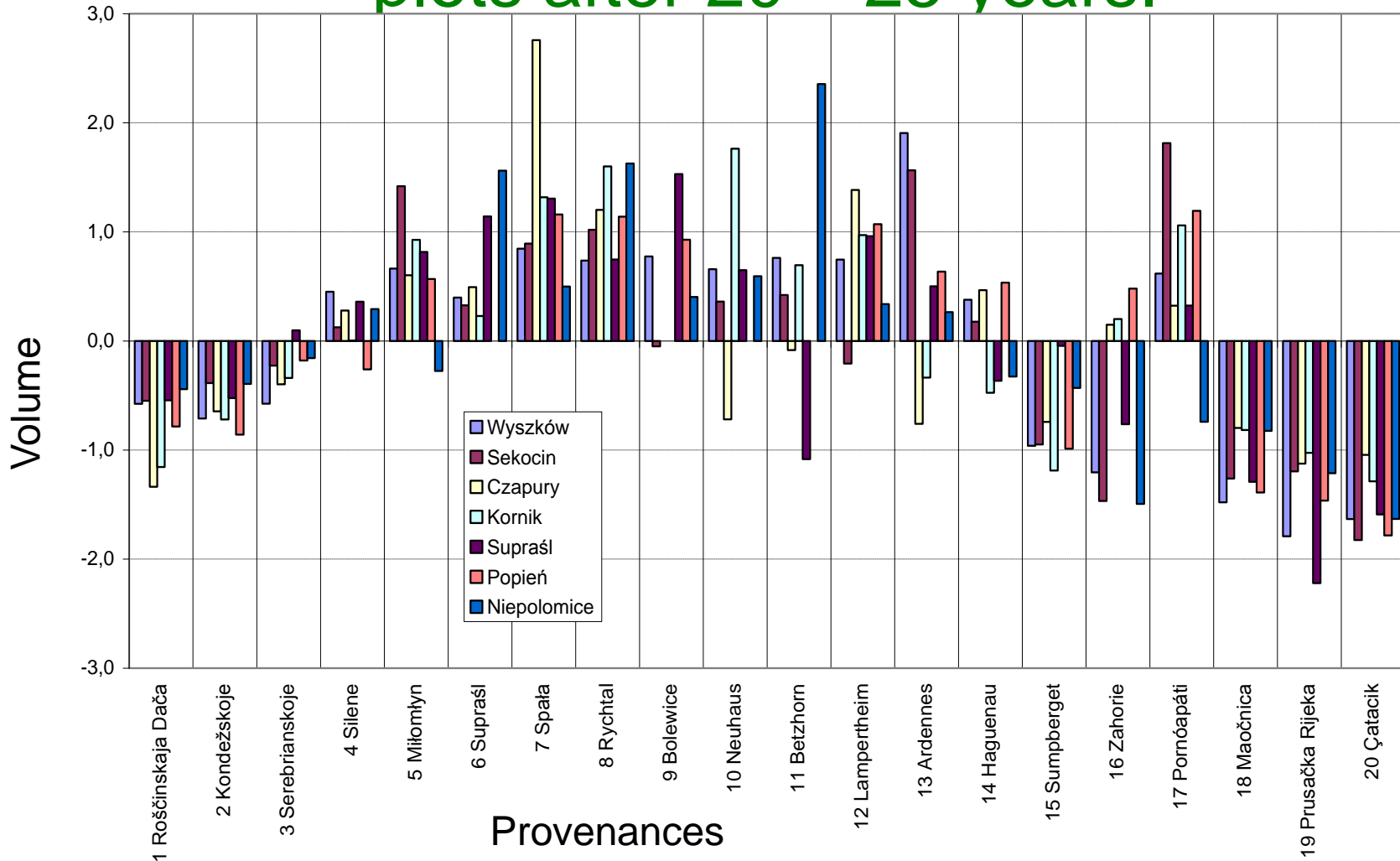
# IUFRO 1982



# Methods

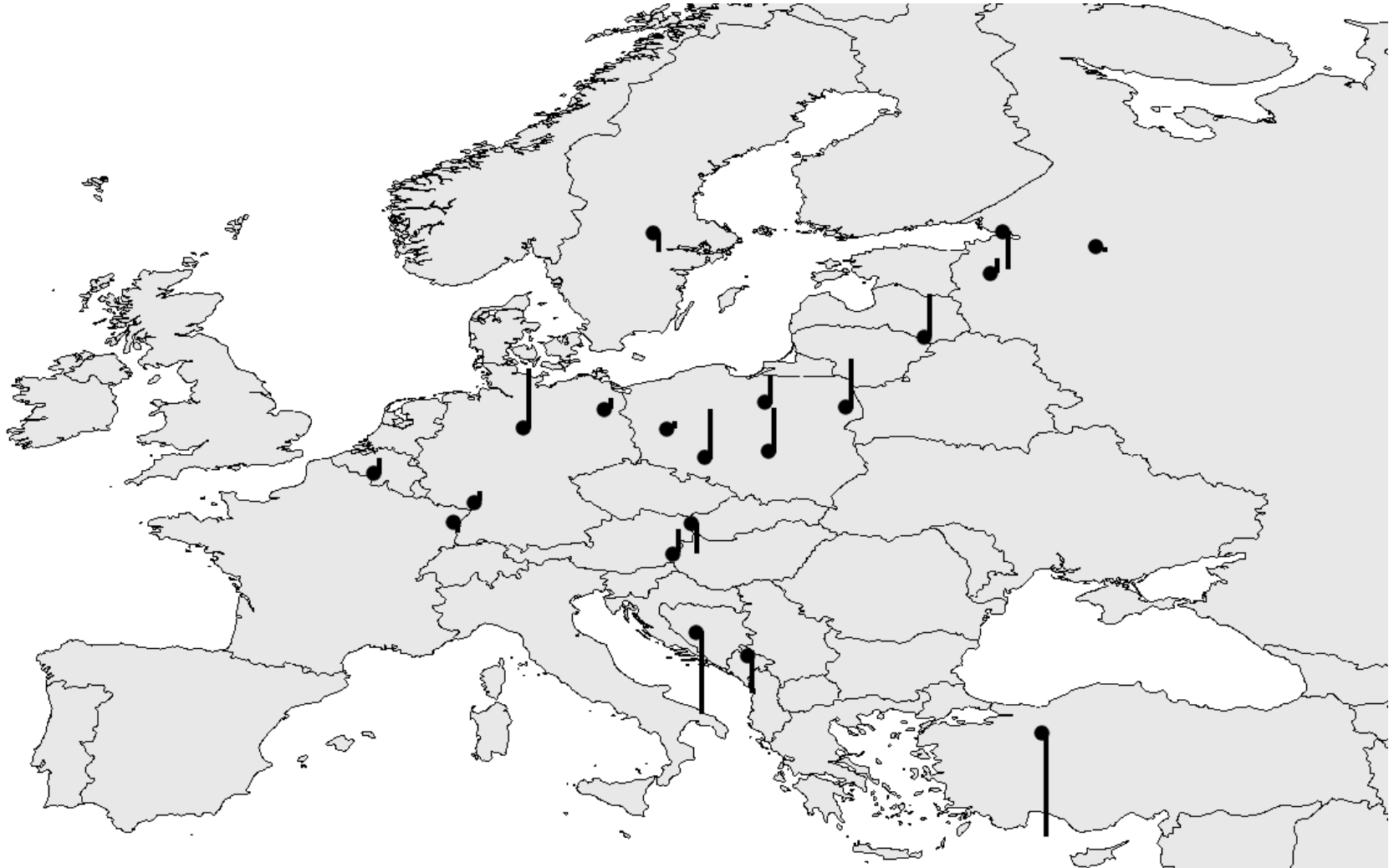
- Not active plots in Poland was revitalised
  - Survival was calculated
  - DBH and Height - measured
  - Stem straightness and branch diameter –  
accessed (1 worst – 5 best)
- Result are presented on the map in standard deviation units (*Giertych method*)
- Raw comparison means with some climatic variables (data from [wordclim.org](http://wordclim.org))

# Standardised volume on Polish experimental plots after 20 – 25 years.



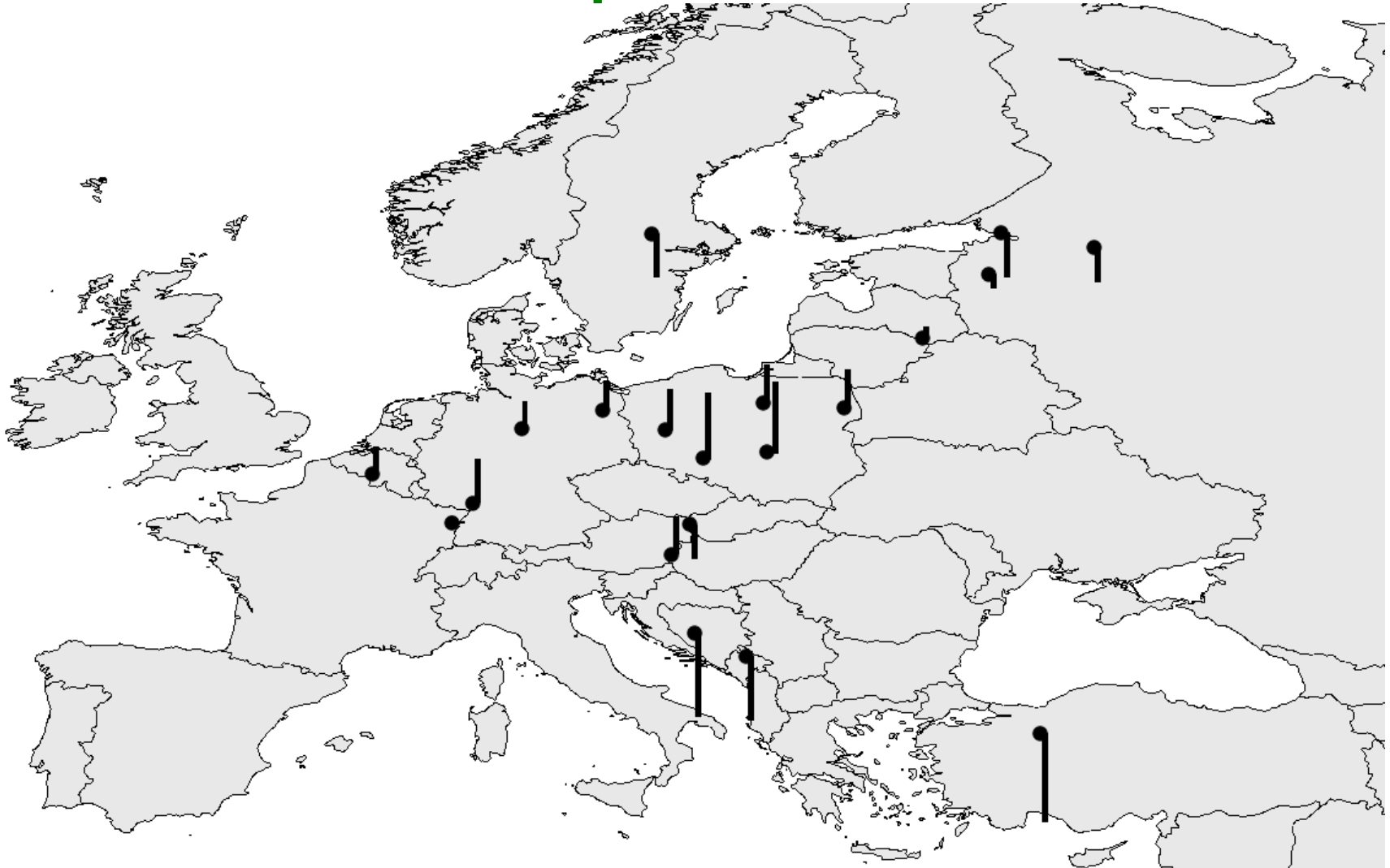


# Survival



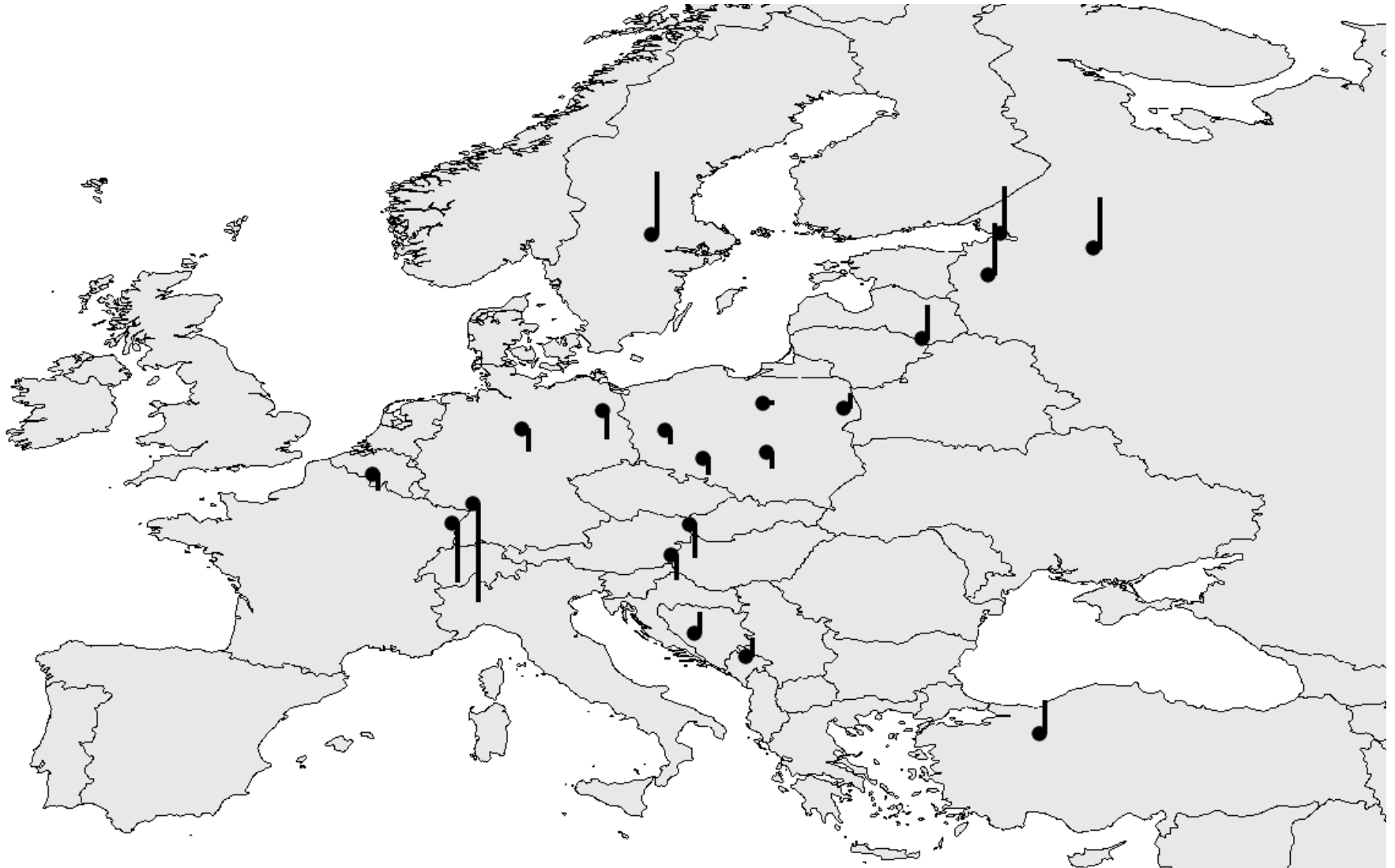
Survival % of different provenances expressed in standard deviation units from the local mean and averaged by all locations. The radius of dot corresponds to  $\pm 0.2$  standard deviation

# Growth performance



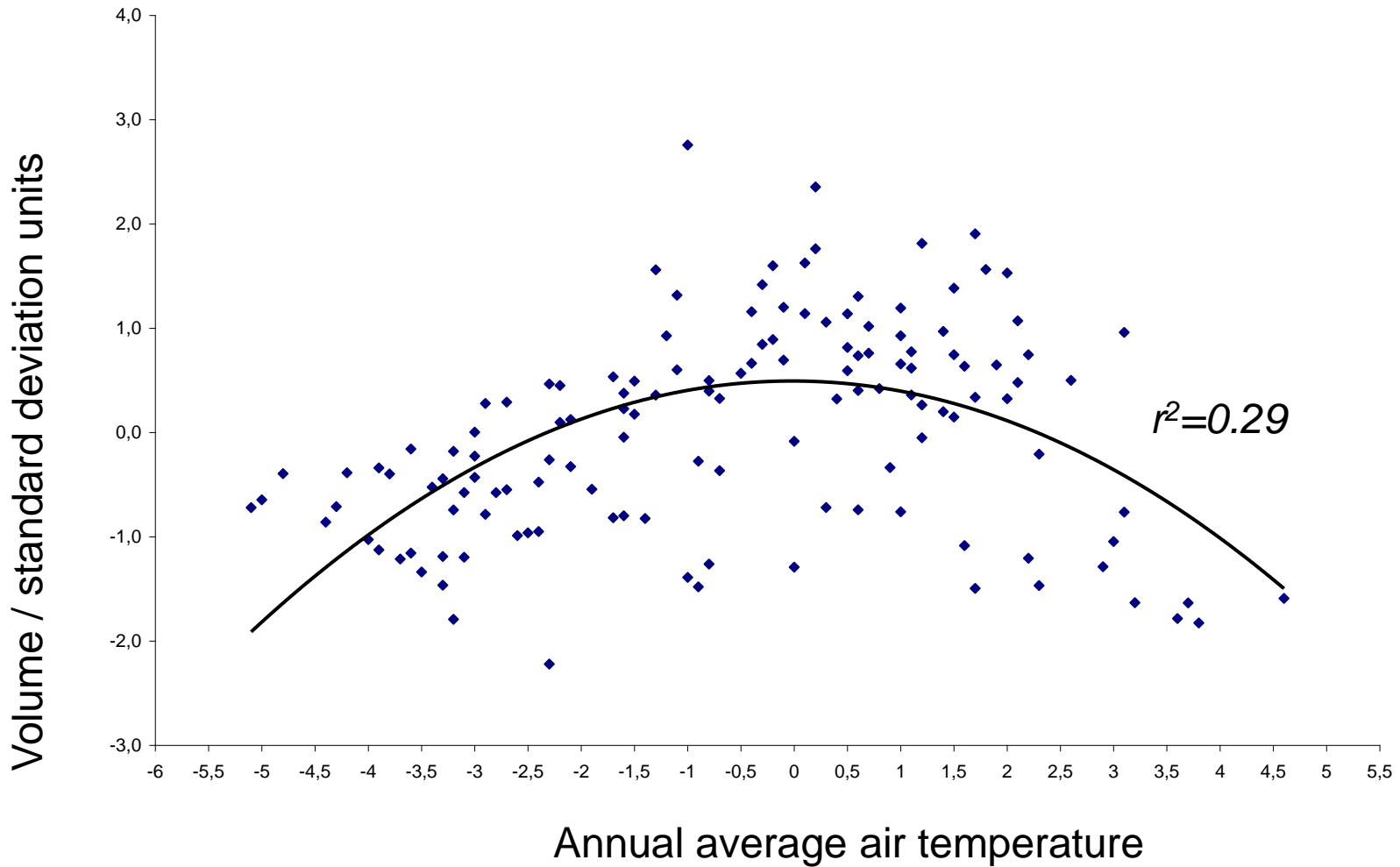
Volume of different provenances expressed in standard deviation units from the local mean and averaged by all locations. The radius of dot corresponds to  $\pm 0.2$  standard deviation

# Stem form

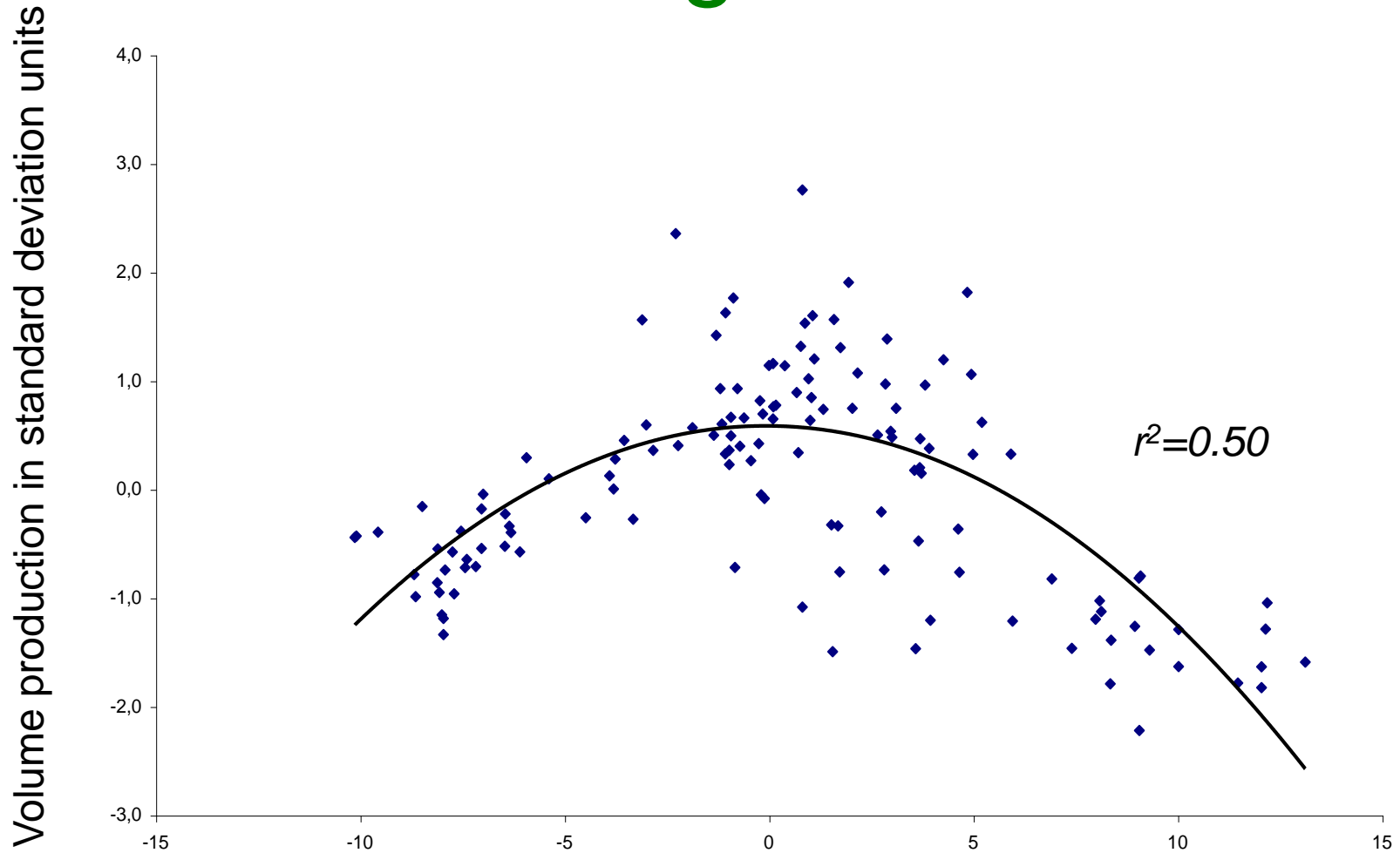


Stem straightness of different provenances expressed in standard deviation units from the local mean and averaged by all locations. The radius of dot corresponds to  $\pm 0.2$  standard deviation

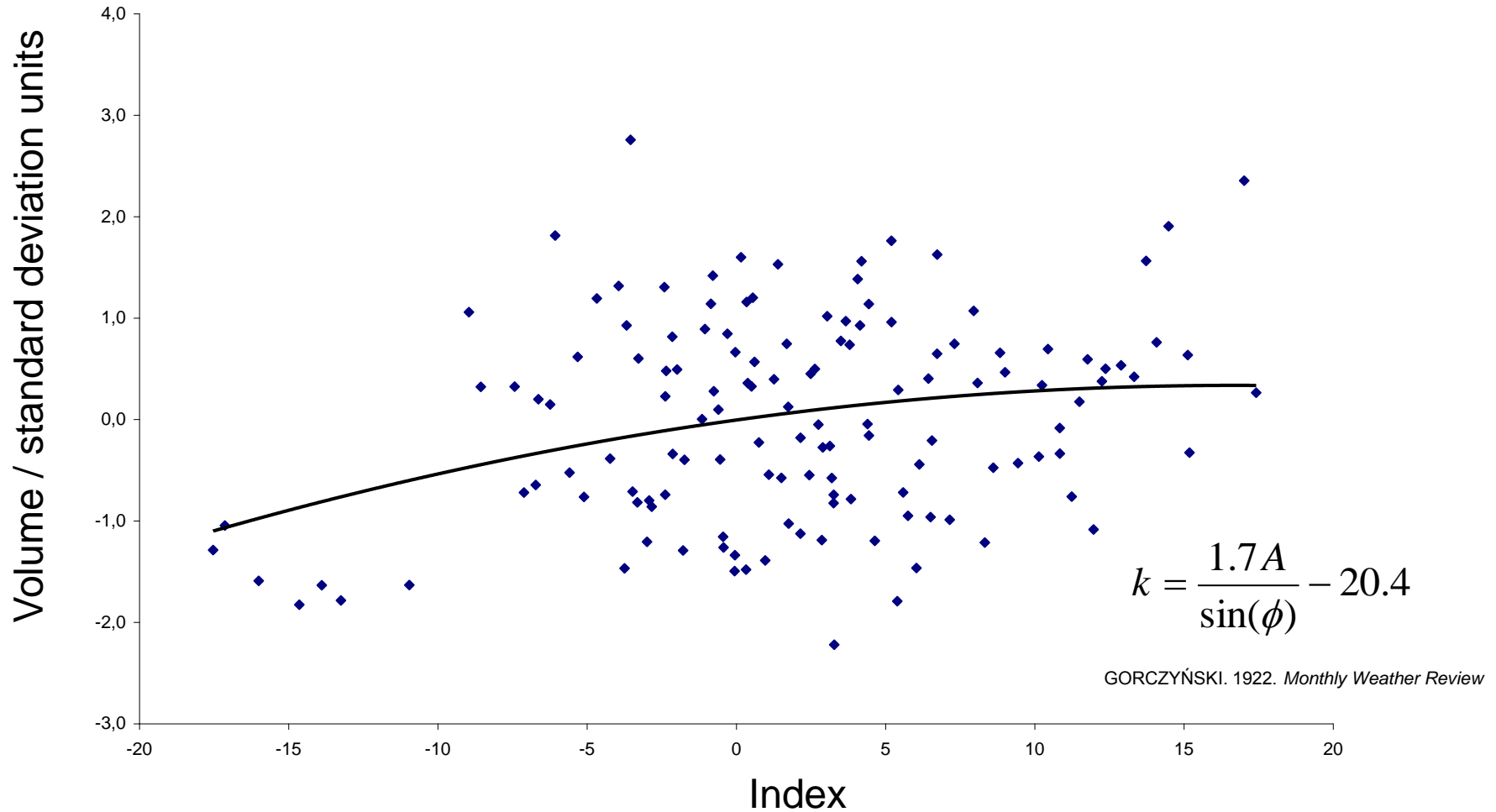
# Volume – average temperature



# Latitudinal gradient W- E



# Continentality index



# Summary

- Strong influence on growth
  - Latitude
  - Temperature
- Small scale in Poland
- Local is not always the best
- Scots pine have huge potential for adaptation
- Populations natural or artificial – seed orchard sources(13 Ardennes)