

Weather

The weather factors were registered with the automatic weather station KaipoRain, Russia. Multiyear average monthly air temperature in some months was 3–4 °C and season average higher 1.8 °C than multiyear average temperature in 2020 and 2022, in 2021 even 2,5°C (Table S10). The coolest April was on 2020 – the temperature was lower than average by 0.2°C, in 2021 and 2022 by 2.0 and 2.7°C respectively. In May 2020, the temperature was lower than average by 1.5°C, but the coolest May was in 2022 (-3.0°C compare to multiyear average). June temperatures in all years of the study was more than multiyear averages and did not have strong differences in the years of the research. The hottest July was in 2021 (+ 5.7°C), but in 2020 and 2022, the temperature values exceeded multiyear averages. The August 2020 was the coolest in our study, in 2021 and 2022 mean daily temperature was higher than multiyear averages by (+ 5.3 and +5.6°C).

Table S10. Average monthly air temperatures (°C) during the growing season in 2020-2022.

Month	Multiyear Averages of Mean Air Temperature (1969–2019)	Year					
		2020		2021		2022	
		Temperature, °C	Variation	Temperature, °C	Variation	Temperature, °C	Variation
April	6.8	6.6	-0.2	8.8	2.0	9.5	2.7
May	14.9	13.4	-1.5	16.5	1.6	11.9	-3.0
June	19.4	20.7	1.3	21.5	2.1	20.6	1.2
July	18.2	21.6	3.4	23.9	5.7	21.8	3.6
August	18.1	19.5	1.4	23.4	5.3	23.7	5.6
September	12.3	15.8	3.5	11.7	-0.6	11.7	-0.6
October	5.1	9.8	4.2	6.4	0.8	8.0	2.4
Mean IV–X	13.5	15.3	1.8	16.0	2.5	15.3	1.8

The most spectacular deviations from Multiyear Averages were documented in precipitation. The amount of rainfall was low in summer months, but in May 2020 it was 1.5 times higher than the usual value for this month (Table S11). The average rainfall amount was lower than the Multiyear Average by 43.6% (in 2020) or 59.3% (in 2021). The highest precipitation amount was in 2022, but here was very uneven distribution (in August 23 mm and in September 121.0). In the April 2020 the amount of rainfall was less than multiyear average by 16,8 mm, in 2021 and 2022 the rainfall was higher by 12.6 and 14.6 mm. In May 2020 and 2021 the amount of precipitation was significantly more than multiyear averages (+25.9 mm and +23.1 mm, respectively), in May 2022 precipitation was lower (-6.5 mm). In June 2020, 2021 and the amount of rainfall was less than usual (-20.2 mm; -15.0 mm and -5.2 mm).

Table S11. Total monthly precipitation (mm) during growing season in 2020-2022.

Month	Total	Year
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	precipitation (Multiyear average, (1969–2019)	2020		2021		2022	
		Precipitation, mm	% of norm	Precipitation, mm	% of norm	Precipitation, mm	% of norm
April	37.8	21.0	55.6	50.4	133.3	52.4	138.6
May	51.3	77.2	150.5	74.4	145.0	44.8	87.3
June	52.4	32.2	61.5	37.4	71.4	47.2	90.1
July	66.7	27.4	41.1	8.2	12.3	79.4	119.0
August	60.8	8.0	13.2	32.0	52.6	23.0	37.8
September	50.2	16.2	32.3	59.6	118.7	121.0	241.0
October	56.4	30.4	53.9	22.8	40.4	83.6	148.2
Mean IV–X	53.7	30.3	56.4	40.7	75.8	64.5	120.1

In July 2020 the precipitation was significantly lower than usual (-39.3 mm) but in the July 2021 the rainfall was extremely little (-58.5 mm). In 2022 the amount of rain was more than multiyear averages almost twice as much (+52.3 mm). Also in August in all of the research years (2020, 2021 and 2022) the amount of rainfall was lower than usual (-52.8 mm, -28.8 mm and -37.8).