

Table S1. Characteristics of the U.S. modern peach breeding germplasm used in this study, including fruitlet freeze tolerance and classification in freeze tolerance groups based on IP (inflection point, °C) and AUC (area under the curve, %). Fruit type – FT; origin – country (state); CR - chilling requirement in chill hours (CH); HR - heat requirement in growing degree hours (GDH); BD - bloom date (BLUP) in Julian Days (JD). Accessions are ordered based on the year of release. Peach – P and nectarine – N. FlavrBurst™ (KV00398); Messina® (NJ352); SummerFest™ (KV981175).

Accession	FT	Origin	Released	CR	HR	BD	Fruitlet Freeze						Grouping			
				(CH)	(GDH)	(JD)	2022		2023		Average		2022		2023	
							IP	AUC	IP	AUC	IP	AUC	IP	AUC	IP	AUC
Elberta	P	USA (GA)	1889	800	5112	75	-5.3	32.6	-5.9	35.4	-5.6	34.0	2	2	2	3
Redrose	P	USA (NJ)	1940	850	1654	75	-6.4	26.4	-5.7	33.6	-6.1	30.0	1	2	2	2
Loring	P	USA (MO)	1946	800	3667	73	-5.1	42.4	-5.4	27.3	-5.3	34.9	2	3	2	2
Coronet	P	USA (GA)	1953	588	5934	69	-6.0	38.7	-5.8	39.1	-5.9	38.9	2	3	2	3
Redglobe	P	USA (MD)	1954	850	1654	75	-6.0	24.7	-5.4	17.7	-5.7	21.2	2	1	2	1
June Gold	P	USA (CA)	1959	650	4879	68	-4.0	45.7	-5.5	33.3	-4.8	39.5	3	3	2	2
Parade	P	USA (CA)	1960	800	3762	72	-7.6	22.5	-5.3	18.5	-6.5	20.5	1	1	2	1
Jefferson	P	USA (VA)	1960	850	3578	77	-4.2	34.5	-5.3	28.7	-4.8	31.6	3	2	2	2
Cresthaven	P	USA (MI)	1963	950	5506	74	-4.6	35.7	-5.5	27.1	-5.1	31.4	3	3	2	2
Empress	P	USA (CA)	1964	650	5400	69	-5.8	31.6	-5.4	32.4	-5.6	32.0	2	2	2	2
Big Red	P	USA (FL)	1969	750	5193	72	-5.3	29.9	-5.0	25.4	-5.2	27.6	2	2	2	2
O’Henry	P	USA (CA)	1970	800	4876	74	-5.5	28.0	-5.3	28.9	-5.4	28.5	2	2	2	2
Brightstar	P	USA (CA)	1976	708	6242	74	-7.6	24.0	-7.5	23.5	-7.6	23.7	1	1	1	1
Topaz	P	USA (MO)	1976	700	-	-	-6.0	23.3	-5.6	24.8	-5.8	24.0	1	1	2	1
Biscoe	P	USA (NC)	1977	900	5380	73	-5.7	34.4	-5.9	29.0	-5.8	31.7	2	2	2	2
Majestic	P	USA (LA)	1979	750	5869	73	-4.7	37.1	-5.5	35.2	-5.1	36.1	3	3	2	3
Sunprince	P	USA (GA)	1982	800	3402	71	-7.8	22.0	-6.0	22.0	-6.9	22.0	1	1	2	1
Ruston Red	P	USA (LA)	1982	800	-	-	-4.9	33.1	-4.6	32.7	-4.8	32.9	2	2	3	2
Goldcrest	P	USA (CA)	1984	650	4598	66	-5.8	35.8	-4.7	36.6	-5.2	36.2	2	3	3	3
Juneprince	P	USA (GA)	1985	650	4598	67	-5.6	32.6	-6.2	29.9	-5.9	31.2	2	2	1	2

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				(CH)	(GDH)	(JD)	2022		2023		Average		2022		2023	
							IP	AUC	IP	AUC	IP	AUC	IP	AUC	IP	AUC
Fireprince	P	USA (GA)	1985	850	5796	73	-4.1	34.3	-5.8	28.7	-4.9	31.5	3	2	2	2
Caroking	P	USA (SC)	1987	636	5824	71	-4.5	40.1	-4.0	44.2	-4.3	42.1	3	3	3	3
Tra-Zee	P	USA (CA)	1988	800	5915	80	-5.3	28.5	-5.4	29.1	-5.3	28.8	2	2	2	2
Carogem	P	USA (SC)	1989	850	2178	75	-6.4	28.2	-5.9	25.3	-6.1	26.7	1	2	2	2
Scarlet Pearl	P	USA (GA)	1989	750	5531	72	-4.7	38.6	-6.0	35.1	-5.3	36.8	3	3	2	3
Rich May	P	USA (CA)	1991	800	3402	70	-5.4	35.3	-	-	-5.4	35.3	2	3	-	-
Summerprince	P	USA (GA)	1992	850	5242	71	-6.8	22.6	-7.2	24.8	-7.0	23.7	1	1	1	1
Glory	P	USA (GA)	1992	800	5280	74	-6.3	21.9	-5.4	15.8	-5.8	18.8	1	1	2	1
Rich Joy	P	USA (CA)	1992	850	-	-	-4.3	44.1	-4.4	39.1	-4.3	41.6	3	3	3	3
Flameprince	P	USA (GA)	1993	850	5661	72	-5.1	32.1	-6.2	29.6	-5.7	30.9	2	2	1	2
Guardian®	P	USA (SC)	1993	850	-	-	-5.0	26.0	-5.8	25.6	-5.4	25.8	3	2	2	2
P.F. 23	P	USA (MI)	1993	700	5287	69	-4.8	32.0	-5.8	34.8	-5.3	33.4	3	2	2	2
Autumn Red	P	USA (CA)	1996	800	5284	78	-4.5	32.0	-5.4	33.4	-5.0	32.7	3	2	2	2
Sweet September	P	USA (CA)	1997	850	2350	80	-8.3	25.4	-6.0	25.4	-7.1	25.4	1	2	2	2
Autumnprince	P	USA (GA)	1997	800	3901	73	-7.3	26.7	-6.3	26.0	-6.8	26.4	1	2	1	2
Snow Prince	P	USA (CA)	1997	-	-	-	-6.2	23.9	-6.6	20.0	-6.4	22.0	1	1	1	1
Rubyprince	P	USA (GA)	1997	850	-	-	-5.4	31.9	-7.8	27.1	-6.6	29.5	2	2	1	2
Sureprince	P	USA (GA)	1998	950	5260	73	-5.9	36.9	-6.2	37.5	-6.1	37.2	2	3	1	3
Valley Sweet	P	USA (CA)	1998	700	4485	64	-5.5	32.2	-6.0	29.2	-5.7	30.7	2	2	2	2
Joanna Sweet	P	USA (CA)	1999	800	5112	75	-5.0	31.9	-5.6	34.7	-5.3	33.3	3	2	2	2
John Boy	P	USA (PA)	2000	800	4365	74	-5.4	31.8	-6.4	28.2	-5.9	30.0	2	2	1	2
China Pearl	P	USA (NC)	2001	1100	-	-	-4.7	36.5	-3.9	35.7	-4.3	36.1	3	3	3	3
White River	P	USA (AR)	2002	700	-	-	-5.3	34.3	-5.7	29.9	-5.5	32.1	2	2	2	2
Julyprince	P	USA (GA)	2004	850	1654	75	-4.1	47.8	-4.9	40.4	-4.5	44.1	3	3	3	3
Carored	P	USA (SC)	2005	612	6197	69	-5.5	35.5	-	-	-5.5	35.5	2	3	-	-

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				(CH)	(GDH)	(JD)	2022		2023		Average		2022		2023	
							IP	AUC	IP	AUC	IP	AUC	IP	AUC	IP	AUC
Augustprince	P	USA (GA)	2006	850	1547	75	-6.3	25.2	-5.4	32.2	-5.8	28.7	1	2	2	2
Early Augustprince	P	USA (GA)	2006	800	5112	74	-6.0	23.4	-6.6	16.1	-6.3	19.8	2	1	1	1
Messina®	P	USA (NJ)	2006	-	-	-	-6.0	33.6	-	-	-6.0	33.6	2	2	-	-
FlavrBurst™	P	USA (WV)	2008	-	-	-	-4.9	33.3	-	-	-4.9	33.3	3	2	-	-
SummerFest™	P	USA (WV)	2010	-	-	-	-5.6	23.3	-6.2	23.9	-5.9	23.6	2	1	1	1
Sweetstar	P	France	2010	-	-	-	-4.8	30.8	-7.1	26.3	-5.9	28.5	3	2	1	2
SC-01	P	USA (SC)	-	800	2706	66	-4.8	37.3	-5.1	38.0	-4.9	37.6	3	3	2	3
SC-02	P	USA (SC)	-	564	5947	62	-5.6	32.7	-5.3	30.0	-5.5	31.4	2	2	2	2
SC-03	P	USA (SC)	-	972	3877	77	-5.4	29.0	-5.3	27.8	-5.4	28.4	2	2	2	2
SC-04	P	USA (SC)	-	996	3052	76	-4.6	31.2	-5.6	33.7	-5.1	32.4	3	2	2	2
SC-05	P	USA (SC)	-	1068	4147	78	-5.2	32.5	-4.7	34.7	-5.0	33.6	2	2	3	2
SC-06	P	USA (SC)	-	1116	4856	72	-6.0	34.9	-5.3	27.4	-5.6	31.1	2	2	2	2
SC-07	P	USA (SC)	-	972	1362	70	-5.6	23.3	-7.2	24.5	-6.4	23.9	2	1	1	1
SC-08	P	USA (SC)	-	800	5095	69	-5.4	24.3	-6.9	27.7	-6.1	26.0	2	1	1	2
SC-09	P	USA (SC)	-	708	5473	71	-4.9	35.5	-5.7	35.6	-5.3	35.5	3	3	2	3
SC-10	P	USA (SC)	-	516	5997	62	-5.7	26.8	-6.0	26.3	-5.9	26.6	2	2	2	2
SC-11	P	USA (SC)	-	1068	3779	73	-5.9	30.0	-5.6	31.7	-5.8	30.9	2	2	2	2
SC-12	P	USA (SC)	-	540	7039	67	-6.4	27.1	-6.1	25.9	-6.2	26.5	1	2	1	2
SC-13	P	USA (SC)	-	516	6863	65	-5.7	28.3	-6.6	28.2	-6.1	28.3	2	2	1	2
SC-14	P	USA (SC)	-	-	-	-	-5.4	30.2	-5.3	29.8	-5.4	30.0	2	2	2	2
SC-15	P	USA (SC)	-	-	-	-	-5.3	31.5	-5.8	28.2	-5.5	29.8	2	2	2	2
Silver Gem	N	USA (CA)	1982	-	-	-	-6.6	20.9	-6.8	22.1	-6.7	21.5	1	1	1	1
Summer Fire	N	USA (CA)	1990	-	-	-	-8.6	20.9	-6.2	23.6	-7.4	22.3	1	1	1	1
Arctic Pride	N	USA (CA)	1993	800	2846	69	-10.2	19.4	-6.0	23.8	-8.1	21.6	1	1	1	1
Arctic Gold	N	USA (CA)	1995	-	-	-	-6.0	23.1	-5.7	22.4	-5.8	22.8	2	1	2	1

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Juneprincess	N	USA (GA)	1997	850	6117	73	-4.0	18.7	-4.1	24.5	-4.1	21.6	3	1	3	1
Arctic Belle	N	USA (CA)	1998	900	6076	75	-6.9	21.0	-7.0	23.9	-6.9	22.5	1	1	1	1
Arctic Blaze	N	USA (CA)	1998	750	4476	69	-6.9	19.8	-5.4	23.1	-6.1	21.5	1	1	2	1
Arrington	N	USA (AR)	2002	750	5193	72	-6.5	22.5	-5.0	32.7	-5.7	27.6	1	1	3	2
Westbrook	N	USA (AR)	2002	750	4791	73	-6.3	23.5	-7.3	23.2	-6.8	23.4	1	1	1	1

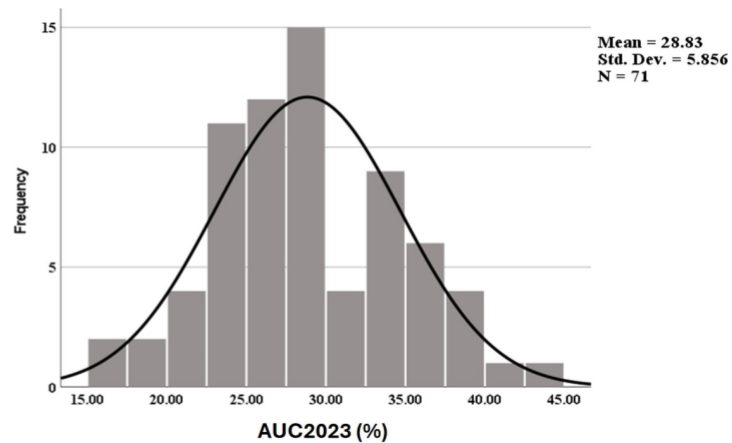
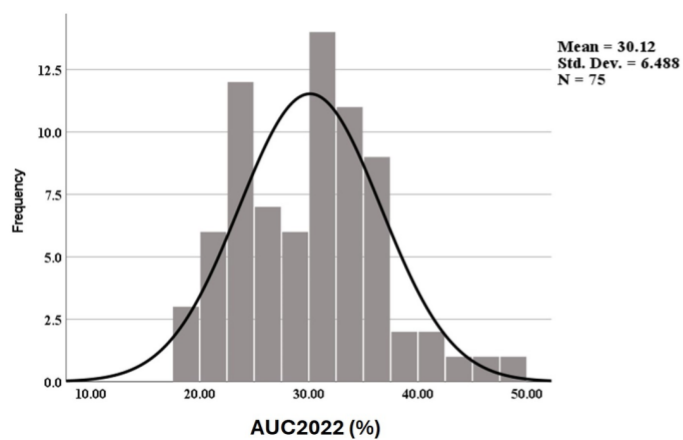
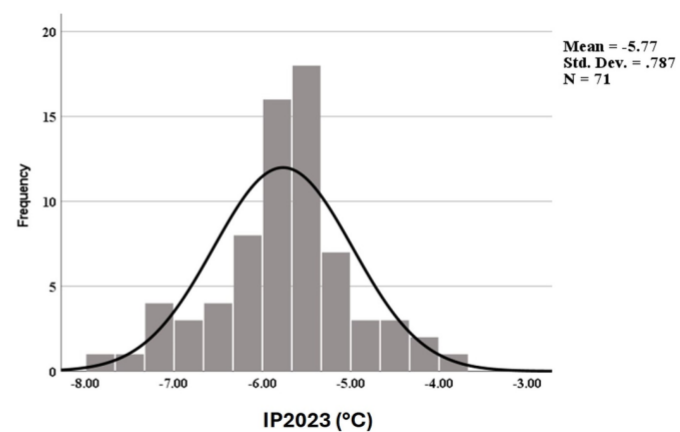
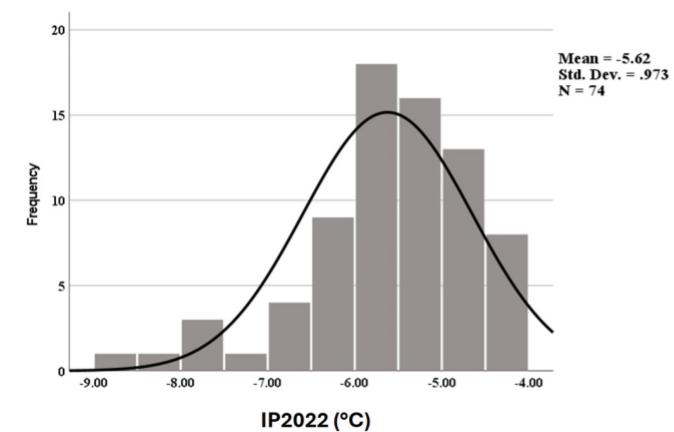


Figure S1. Frequency distribution of Inflection Point (IP) and area under the curve (AUC) of fruitlet freeze tolerance within the peach and nectarine germplasm in 2022 and 2023 season.

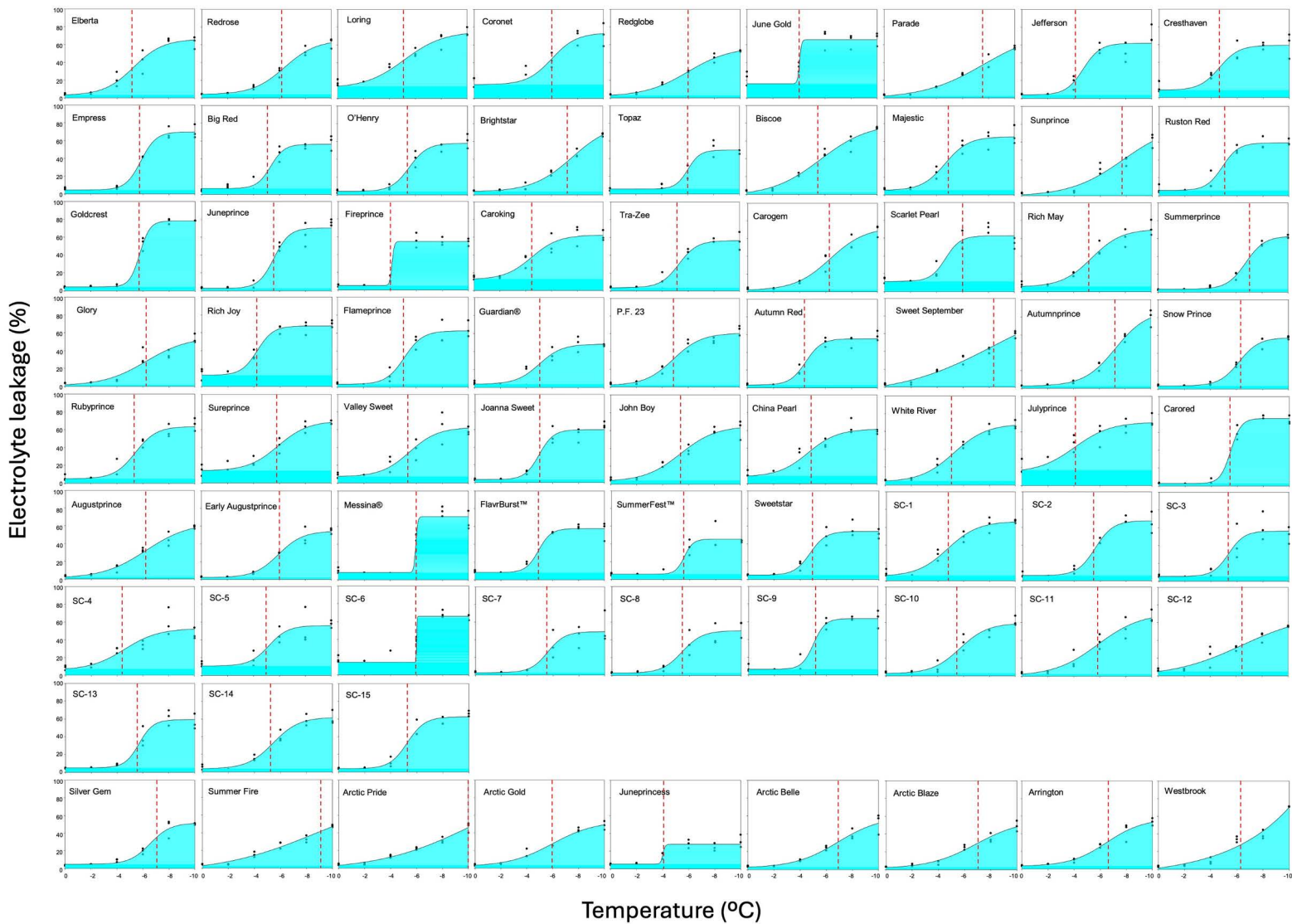


Figure S2. Fruitlet response to freezing temperatures observed in peach and nectarine germplasm in 2022. Accessions are separated in two groups peach and nectarines (last nine) and listed by release year from left to right; red line designates inflection point, the temperature at which 50% of fruitlets experience damage; blue area – area under the sigmoid curve represents % damage.

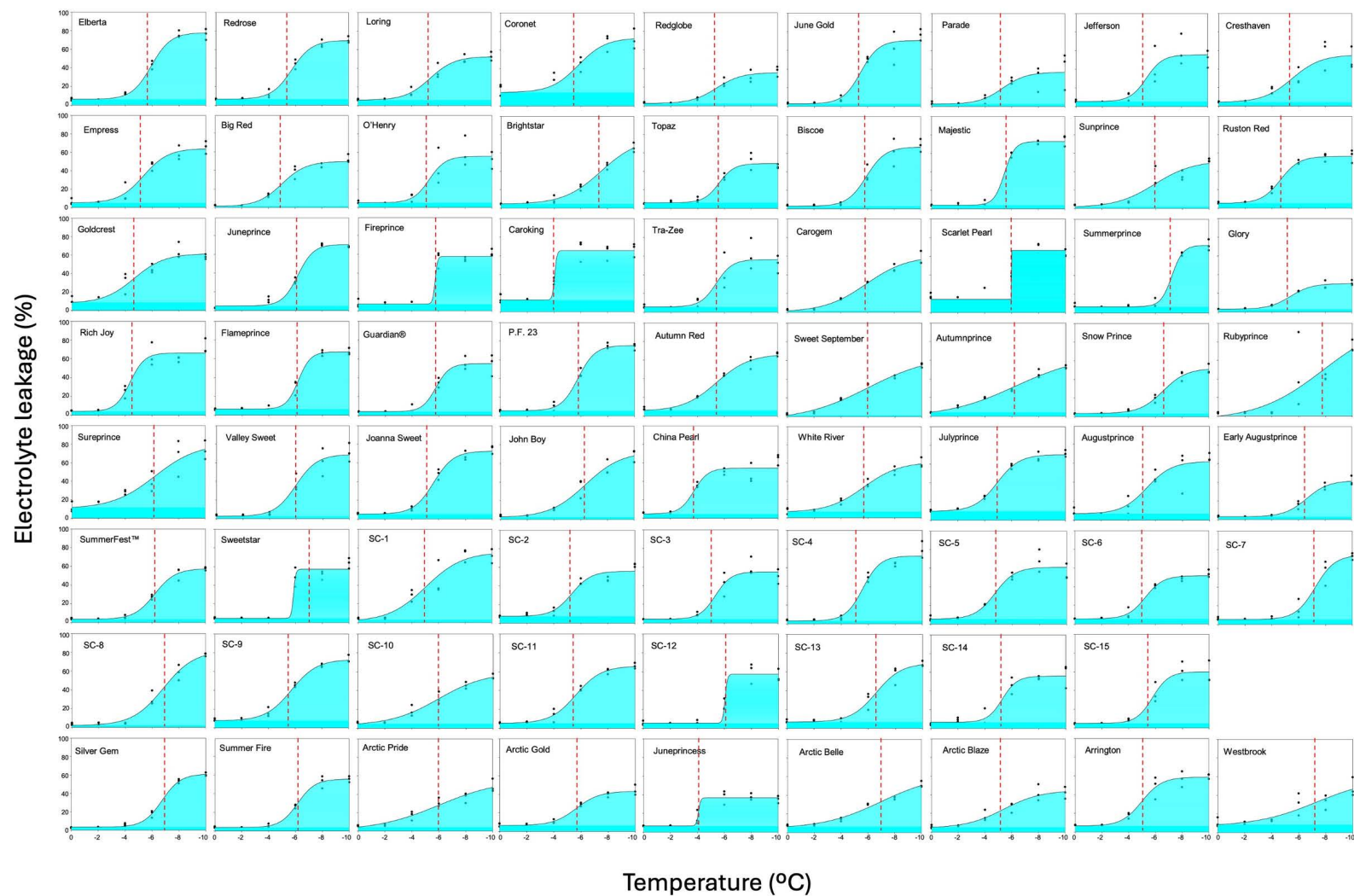


Figure S3. Fruitlet response to freezing temperatures observed in peach and nectarine germplasm in 2022. Accessions are separated in two groups peach and nectarines (last nine) and listed by release year from left to right; red line designates inflection point, the temperature at which 50% of fruitlets experience damage; blue area – area under the sigmoid curve represents % damage.