

## SUPPLEMENTARY MATERIAL

### Architecture-based machine learning models for peach yield prediction before bloom

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**Table S1.** Number and weight of fruits, per tree per level and per year, as well as the production percentage contribution of each structural level

Code	Tree position	Fruit total weight (g)	Fruits total number	Trunk	Level					PEA	PR	R PEPR	R MPEPR
					1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	Mg·ha <sup>-1</sup>		%	
PT1	A6 L5	24,073 <sup>c</sup>	154 <sup>c</sup>	13	61 <sup>a</sup>	61 <sup>b</sup>	18 <sup>b</sup>	1 <sup>b</sup>	0	13.38 <sup>a</sup>	24.03 <sup>a</sup>	56	59
PT2	A10 L9	30,327 <sup>c</sup>	192 <sup>c</sup>	31	75 <sup>a</sup>	73 <sup>b</sup>	13 <sup>b</sup>	0 <sup>b</sup>	0	16.86 <sup>a</sup>		70	74
PT3	A10 L11	38,685 <sup>c</sup>	263 <sup>c</sup>	73	148 <sup>a</sup>	40 <sup>b</sup>	2 <sup>b</sup>	0 <sup>b</sup>	0	21.51 <sup>a</sup>		90	94
PT4	A6 L11	32,247 <sup>c</sup>	232 <sup>c</sup>	56	127 <sup>a</sup>	37 <sup>b</sup>	9 <sup>b</sup>	3 <sup>b</sup>	0	17.93 <sup>a</sup>		75	79
PT5	A11 L13	31,442 <sup>c</sup>	217.5 <sup>c</sup>	48	66 <sup>a</sup>	63 <sup>b</sup>	40 <sup>b</sup>	1 <sup>b</sup>	0	17.48 <sup>a</sup>		73	77
Total		156,774	1059	221	477	274	82	5	0	–	–	73	76
Average fruit weight per tree 2019		31,354.8	representation (%)	21	45	26	8	0	0	–	–	–	–
PT1	A6 L5	47,278.2 <sup>a</sup>	363 <sup>a</sup>	13	92 <sup>a</sup>	153 <sup>a</sup>	76 <sup>a</sup>	29 <sup>a</sup>	0	26.29 <sup>a</sup>	20.1 <sup>a</sup>	131	115
PT2	A10 L9	45,175.03 <sup>a</sup>	296 <sup>a</sup>	25	107 <sup>a</sup>	106 <sup>a</sup>	58 <sup>a</sup>	0 <sup>a</sup>	0	25.12 <sup>a</sup>		125	110
PT3	A10 L11	40,191.6 <sup>a</sup>	253 <sup>a</sup>	24	40 <sup>a</sup>	73 <sup>a</sup>	75 <sup>a</sup>	27 <sup>a</sup>	14	22.35 <sup>a</sup>		111	98
PT4	A6 L11	29,439.09 <sup>a</sup>	216 <sup>a</sup>	15	66 <sup>a</sup>	55 <sup>a</sup>	45 <sup>a</sup>	21 <sup>a</sup>	14	16.37 <sup>a</sup>		81	72
PT5	A11 L13	45,722.52 <sup>a</sup>	282 <sup>a</sup>	29	102 <sup>a</sup>	81 <sup>a</sup>	53 <sup>a</sup>	17 <sup>a</sup>	0	25.42 <sup>a</sup>		126	111
PT6	A14 L13	37,052.93	236	24	140	55	11 <sup>a</sup>	6	0	20.60		102	90
PT7	A16 L15	40,087.08	239	15	118	71	33	2	0	22.29		111	98
PT8	A8 L14	44,957.94	302	6	148	86	54	8	0	25.00		124	110
PT9	A8 L12	26,772.58	178	12	69	64	16	13	4	14.89		74	65
PT10	A10 L15	40,296.22	238	9	55	47	93	32	2	22.40		111	98
Total		396,973.2	2603	172	937	791	514	155	34	–	–	110	97
Average fruit weight per tree 2021		39,697.32	representation (%)	7	36	30	20	6	1	–	–	–	–

continue Tab. S1

Code	Tree position	Fruit total weight (g)	Fruits total number	Trunk	Level					PEA	PR	R PEPR	R MPEPR
					1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>				
PT1	A6 L5	31,380 <sup>ab</sup>	233 <sup>ab</sup>	16	39 <sup>a</sup>	110 <sup>a</sup>	43 <sup>a</sup>	13 <sup>a</sup>	12	17.45 <sup>a</sup>	24.3 <sup>a</sup>	72	76
PT2	A10 L9	30,440 <sup>ab</sup>	228 <sup>ab</sup>	1	31 <sup>a</sup>	62 <sup>a</sup>	97 <sup>a</sup>	36 <sup>a</sup>	1	16.92 <sup>a</sup>		70	74
PT3	A10 L11	29,353.5 <sup>ab</sup>	220 <sup>ab</sup>	4	78 <sup>a</sup>	86 <sup>a</sup>	37 <sup>a</sup>	8 <sup>a</sup>	7	16.32 <sup>a</sup>		67	72
PT4	A6 L11	44,750 <sup>ab</sup>	295 <sup>ab</sup>	4	51 <sup>a</sup>	107 <sup>a</sup>	86 <sup>a</sup>	33 <sup>a</sup>	14	24.88 <sup>a</sup>		102	109
PT5	A11 L13	41,070 <sup>ab</sup>	293 <sup>ab</sup>	10	74 <sup>a</sup>	114 <sup>a</sup>	53 <sup>a</sup>	37 <sup>a</sup>	5	22.83 <sup>a</sup>		94	100
PT6	A14 L13	43,990	334	12	70	120	60	71	1	24.46		101	107
PT7	A16 L15	26,580	204	4	34	109	53	4	0	14.78		61	65
PT8	A8 L14	41,000	323	7	96	141	43	36	0	22.80		94	100
PT9	A8 L12	41,090	317	2	75	115	85	29	11	22.85		94	100
PT10	A10 L15	27,480	210	2	53	80	52	12	11	15.28		63	67
Total		357,133.5	2657	62	601	1044	609	279	62	–	–	82	87
Average fruit weight per tree 2022		35,713.35	representation (%)	2	23	39	23	11	2	–	–	the yield estimation from the tree production for 3 seasons = 88.37	–
Average fruit weight per tree for 3 seasons		–	2106 ±52.24	152	672	703	402	146	32	–	–		–
Representation for 3 <sup>rd</sup> season (%)		–	–	7	32	33	19	7	2	–	–		–
Cumulated representation (%)		–	–	7	39	72	91	98	100	–	–		–

Explanations: same letters in the superscript indicate no statistical difference between the averages, different letters in the superscript indicate statistically different averages; *PEA* = estimated annual orchard weight, *PR* = actual annual orchard weight, *R PEPR* = estimated annual orchard weight ratio compared to actual annual orchard weight, *R MPEPR* = estimated annual orchard weight ratio compared to actual average annual orchard weight; based on the annual average contribution of fruit number per level, it is noteworthy that the 1<sup>st</sup> to 4<sup>th</sup> level of production contribute to 91% of the total average production of the trees during the three seasons (2018/2019; 2020/2021; 2021/2022).

Source: own study.