

THE RELATIONSHIPS BETWEEN LEAF AREA AND OTHER PARAMETERS IN LOQUAT

Mehtap ŞENYURT, Turan KARADENİZ, Tuba BAK

Ordu University- Faculty of Agriculture, Department of Horticulture, 52100 Ordu-Turkey

Corresponding author email: turankaradeniz@hotmail.com

Abstract

The study about the relationships between leaf area of loquat and cluster length, cluster weight, fruit number per cluster, leaf length, leaf width, leaf stalk length, leaf stalk thickness, leaf area, fruit weight, fruit size, fruit stalk length, fruit stalk thickness, fruit volume, calyx basin width, calyx basin depth, fresh/seed ratio, seed number, seed weight, seed length, seed width, total soluble solids, pH, titratable acidity, leaf ash was made. A relationship was determined between leaf areas with some parameters. As a result of the research, there was a large negative correlation found between leaf area and fruit number per cluster, seed number, seed weight, seed width; a negative correlation found between leaf area and fruit weight, acids, and a large positive correlation found between leaf area and leaf stalk length. The aim of the study is to determine the relationships between leaf area and others parameters and this study can offer an insight to the future improvement researches in regard to Loquat in the Black Sea.

Key words: *Eriobotrya japonica*, leaf area, fruit characteristics, correlation

INTRODUCTION

The loquat cultivation in Turkey has developed noticeably in recent years. Production of loquat was 3.000 tons in 1980; 11.500 tons in 2000; 12.000 tons in 2005. While 96.64% of the total production is from Mediterranean Region, 2.09% of total production is from Aegean Region and 1.24% of it is from Black Sea Region [1].

In Black Sea Region, the loquat is consumed as fresh. There aren't any orchards in Black Sea Region; trees are found in the houses with a orchard for pleasure. This situation increases the importance of selection improvement for loquat fruit.

Leaves are essential parts of the plants and they are the food sources of the plants thanks to the photosynthesis. So, they undertake some important duties in the framework of blooming, fruit set, fruit growing and other physiological activities. Temperate fruit species blossom in spring after short day conditions in winter have passed. The number of the fruit species that blossom in autumn and have fruits in winter is very few. One of them is the loquat [2].

In this study, leaf and fruit characteristics of the loquat in the central districts of Ordu have been determined and the relations between the leaf area and important fruit criteria have been observed.

MATERIALS AND METHODS

This study has been conducted on the loquat that is cultivated in the central districts of Ordu (Photo 1,2). Physical and chemical analyses have been performed on the leaves and fruits that were obtained from the four vectors of the trees. In the types, some characteristics have been determined such as; clusterlength (CL, mm), cluster weight (CW, g), fruit number per cluster (FNC), leaf length (LL, mm), leaf width (LW, mm), leaf stalk length (LSL, mm), leaf stalk thickness (LST, mm), leaf area (LA, cm²), fruit weight (FW, g), fruit size (FS, (fruit width+ fruit length)/2), fruit stalk length (FSL, mm), fruit stalk thickness (FST, mm), fruit volume (FV, ml), calyx basin width (CBV, mm), calyx basin depth (CBD, mm), fresh/seed ratio (F/S, %), seed number (SN), seed weight (SW, g), seed length (SL, mm), seed width (SWI, mm), total soluble solids (TSS, %), pH, titratable acidity (TA, g/L, malic acid), leaf ash (LA, %).

Correlation coefficients of these characteristics and direct and indirect effect of leaf area on the other characteristics have been identified by path analysis [3].



Photo 1. Selected of loquat in Ordu



Photo 2. Loquat in Ordu

RESULTS AND DISCUSSIONS

Negative and crucial relation between leaf area and fruit number per cluster, seed number, seed weight, seed width; positive and important relations with leaf stalk length; negative and important relations between fruit weight and acidity are observed.

Positive and important relationship is identified among cluster weight, fruit number per cluster and cluster length. (Table 1)

Positive and important relationship is identified between fruit number per cluster and cluster length. On the other hand, negative and

important relationship is identified among leaf stalk length, fruit weight, fruit size, fruit volume and seed length. It is also identified that there is negative and important relationship between leaf stalk length and calyx basin width. Positive and significant relationships are determined between leaf width and leaf length, among leaf stalk length, leaf stalk thickness, calyx basin width, calyx basin depth, pH. Furthermore, positive and important relationship between fruit volume and fresh/seed ratio is determined. It is also identified that there is negative relationship with acidity and negative and important relationship between fruit stalk thickness and leaf ash.

Positive and significant relationships are determined between leaf length and leaf stalk length, between leaf stalk thickness, calyx basin width and calyx basin depth and pH. Positive and important relationship with fresh/seed ratio is identified, negative and important relationship with acidity is determined. There is also negative and important relationship with fruit stalk thickness.

Positive and significant relationships are determined between fruit weight and fruit size and between calyx basin width, fresh/seed ratio, seed weight and seed length. Negative and crucial relationship with pH is identified. Furthermore, positive and significant relationships are determined between fruit size and fruit volume, calyx basin width, fresh/seed ratio, seed length. It is also identified that there is positive and important relationship with calyx basin depth, negative and important relationship between pH.

Positive and significant relationships is identified between fruit volume and calyx basin width, fresh/seed ratio, seed weight, seed length, positive and important relationship with calyx basin depth is determined. It is also identified that there is negative and important relationship between fresh/seed ratio and seed number.

Direct relationship between leaf area and leaf ash, titratable acidity, cluster weight is exercised on the highest level. (Table 2)

This situation shows us that as it is expected, leaf area affects directly organic material in the leaf.

Table 1. Mutual relations between leaf area and other fruit characteristics

:	LA	CW	FNC	LW	LL	LSL	LST	CL	FW	FS	FSL	FST	FV	CBW	CBD	F/S	SN	SW	SL	SWI	TSS	pH	TA	LA
LA	1,00	-0.522**	-0.162	0.274	0.275	0.352*	0.290	-0.245	-0.354*	-0.300	0.093	-0.001	-0.2907	0.002	0.123	0.178	-0.522**	-0.509**	-0.213	-0.447**	-0.108	0.310	-0.329*	0.084
CW		1,00	0.572**	-0.128	-0.129	-0.120	-0.027	0.345*	0.309	0.274	-0.129	0.229	0.299	0.180	-0.036	0.030	0.314	0.280	0.033	0.079	-0.040	-0.090	0.127	0.024
FNC			1,00	-0.275	-0.204	-0.555**	-0.368*	0.424**	-0.466**	-0.471**	-0.054	0.034	-0.459**	-0.370*	-0.228	-0.293	0.016	-0.237	-0.478**	-0.033	-0.059	0.292	-0.212	-0.143
LW				1,00	0.916**	0.459**	0.714**	0.211	0.255	0.338	0.107	-0.371*	0.328*	0.573**	0.476**	0.329*	-0.216	-0.032	0.078	-0.277	-0.041	0.424**	-0.454**	0.353*
LL					1,00	0.545**	0.595**	0.144	0.220	0.303	0.024	-0.365*	0.308	0.614**	0.492**	0.351*	-0.254	-0.076	0.075	-0.202	-0.085	0.521**	-0.585**	-0.179
LSL						1,00	0.488**	-0.077	0.471**	0.559**	-0.019	-0.056	0.553**	0.641**	0.344*	0.387*	-0.191	0.166	0.531**	-0.168	0.000	0.095	-0.176	0.249
LST							1,00	0.158	0.324*	0.381*	0.228	-0.081	0.340*	0.301	0.736**	0.381*	-0.327*	-0.049	0.318	-0.317	0.045	0.005	-0.025	-0.192
CL								1,00	0.064	0.099	0.525**	-0.352*	0.075	-0.084	0.027	-0.126	0.029	0.136	0.259	-0.251	0.096	0.230	-0.240	-0.185
FW									1,00	0.972**	-0.141	0.262	0.987**	0.658**	0.312	0.503**	0.294	0.644**	0.623**	0.171	-0.260	-0.378*	0.309	0.160
FS										1,00	-0.121	0.271	0.983**	0.697**	0.392*	0.530**	0.176	0.602**	0.677**	0.212	-0.233	-0.324*	0.288	0.085
FSL											1,00	-0.288	-0.156	-0.215	-0.005	-0.284	0.025	0.065	0.297	-0.290	0.210	0.001	-0.114	0.186
FST												1,00	0.235	0.061	0.232	0.276	-0.016	0.171	0.107	0.527**	-0.564**	-0.654**	0.704**	0.176
FV													1,00	0.724**	0.321*	0.533**	0.246	0.612**	0.617**	0.166	-0.283	-0.280	0.217	0.174
CBW														1,00	0.146	0.306	0.298	0.497**	0.370*	-0.043	-0.243	0.096	-0.136	0.081
CBD															1,00	0.538**	-0.509**	-0.146	0.295	0.109	-0.052	-0.158	0.171	-0.219
F/S																1,00	-0.541**	-0.297	0.007	0.332	-0.308	-0.087	-0.017	0.006
SN																	1,00	0.801**	0.199	-0.139	-0.081	-0.187	0.174	0.263
SW																		1,00	0.619**	0.007	-0.178	-0.415**	0.401*	0.162
SL																			1,00	-0.046	0.167	-0.347*	0.375*	0.182
SWI																				1,00	-0.362*	-0.416**	0.396*	0.012
TSS																					1,00	0.137	-0.073	-0.309
Ph																						1,00	-0.933**	0.032
TA																							1,00	-0.130
LA																								1,00

*, **: significant at 0.05 and 0.01 probability

Table 2. Direct and Indirect Effects of Leaf Area on Some Fruit Characteristics

	DE	INDIRECT EFFECT																						
		CW	FNC	LW	LL	LSL	LST	CL	FW	FS	FSL	FST	FV	CBW	CBD	F/S	SN	SW	SL	SWI	TSS	pH	TA	LAS
CW	31.48	-	21.10	0.63	0.62	0.26	0.29	2.76	8.17	3.51	0.09	4.13	4.31	5.20	0.15	0.44	7.49	0.72	0.92	0.54	0.64	0.41	5.37	0.64
FNC	26.89	13.11	-	1.00	0.72	0.89	2.91	2.47	8.99	4.40	0.02	0.44	4.82	7.80	0.69	3.18	0.28	0.44	9.72	0.16	0.68	0.98	6.53	2.78
LW	4.14	3.33	8.39	-	3.67	0.83	6.43	1.39	5.58	3.58	0.06	5.56	3.91	13.72	1.65	4.05	4.28	0.06	1.80	1.59	0.53	1.62	15.84	7.81
LL	4.07	3.42	6.34	3.85	-	1.01	5.44	0.97	4.90	3.27	0.01	5.56	3.74	14.95	1.73	4.40	5.10	0.16	1.76	1.18	1.15	2.02	20.82	4.03
LSL	1.73	2.98	16.12	1.80	2.07	-	4.17	0.48	9.82	5.43	0.01	0.79	6.28	14.58	1.13	4.53	3.59	0.33	11.68	0.92	0.00	0.34	5.87	5.24
LST	11.13	0.87	13.91	3.65	2.95	1.10	-	1.29	8.80	5.01	0.17	1.50	5.03	8.92	3.15	5.81	8.00	0.12	9.11	2.26	0.74	0.02	1.09	5.26
CL	9.86	13.39	19.27	1.29	0.86	0.20	2.11	-	2.09	1.56	0.49	7.86	1.33	3.00	0.13	2.30	0.85	0.43	8.92	2.15	1.89	1.30	12.50	6.10
FW	15.50	5.69	10.07	0.74	0.62	0.60	2.06	0.30	-	7.30	0.06	2.78	8.34	11.14	0.76	4.38	4.10	0.98	10.20	0.69	2.44	1.02	7.64	2.49
FS	7.61	5.11	10.31	1.00	0.87	0.70	2.46	0.56	15.26	-	0.05	2.90	8.41	11.96	0.97	4.67	2.49	0.92	11.22	0.87	2.21	0.88	7.21	1.34
FSL	1.23	6.57	3.21	0.86	0.18	0.06	4.02	6.81	6.31	2.52	-	8.44	3.65	10.09	0.03	6.85	0.98	0.27	13.47	3.27	5.45	0.01	7.83	8.05
FST	16.61	6.60	1.14	1.70	1.62	0.11	0.80	2.59	6.37	3.18	0.20	-	3.11	1.62	0.89	3.76	0.35	0.40	2.73	3.37	8.31	2.77	27.33	4.33
FV	8.57	5.58	10.06	0.97	0.88	0.72	2.19	0.35	15.53	7.48	0.07	2.52	-	12.44	0.79	4.71	3.49	0.94	10.24	0.68	2.70	0.76	5.45	2.76
CBW	21.57	4.23	1.20	2.13	2.22	1.05	2.44	0.50	13.00	6.67	0.12	0.82	7.80	-	0.45	3.40	5.31	0.96	7.70	0.22	2.91	0.33	4.27	1.62
CBD	4.26	1.15	8.58	2.43	2.43	0.77	8.16	0.22	8.42	5.13	0.00	4.28	4.73	4.30	-	8.16	12.40	0.38	8.41	0.77	0.84	0.74	7.37	5.97
F/S	14.51	0.91	10.56	1.60	1.65	0.83	4.03	0.98	12.98	6.62	0.21	4.86	7.50	8.63	2.19	-	12.60	0.75	0.17	2.25	4.81	0.39	0.70	0.15
SN	24.19	10.00	0.60	1.09	1.24	0.42	3.59	0.23	7.87	2.28	0.01	0.29	3.60	8.72	2.15	8.15	-	2.10	5.63	0.98	1.31	0.87	7.45	7.11
SW	1.83	6.24	6.18	0.11	0.26	0.25	0.37	0.77	12.06	5.46	0.03	2.18	6.24	10.16	0.43	3.13	13.53	-	12.23	0.03	2.017	1.35	11.99	3.05
SL	20.85	0.78	13.15	0.29	0.27	0.87	2.58	1.54	12.31	6.48	0.16	1.44	6.64	7.97	0.92	0.07	3.55	1.19	-	0.23	1.99	1.19	11.81	3.63
SWI	9.37	3.34	1.63	1.86	1.31	0.49	4.63	2.69	6.08	3.65	0.29	12.82	3.23	1.67	0.61	6.65	4.47	0.02	1.71	-	7.81	2.58	22.54	0.43
TSS	20.29	1.59	2.74	0.25	0.52	0.00	0.62	0.96	8.70	3.77	0.20	12.91	5.17	8.89	0.27	5.79	2.43	0.58	5.89	3.19	-	0.80	3.88	10.46
Ph	3.83	2.36	8.95	1.76	2.09	0.17	0.04	1.52	8.30	3.45	0.00	9.82	3.35	2.30	0.54	1.07	3.70	0.89	8.05	2.40	1.82	-	32.76	0.70
TA	34.67	3.28	6.42	1.86	2.32	0.31	0.22	0.31	6.71	3.02	0.07	10.45	2.57	3.21	0.58	0.20	3.41	0.58	8.58	2.26	0.95	3.53	-	2.84
LAS	34.93	0.99	6.89	2.30	1.13	0.71	2.73	1.93	5.52	1.42	0.18	4.17	3.28	3.07	1.19	0.11	8.20	0.54	6.64	0.10	6.48	0.19	7.17	-

In conclusion, leaf area in evergreen loquats affects important characteristics such as leaf ash, titratable acidity, cluster weight. On the other hand, as a result of analyses, important relationship is determined between fruit weight and fruit size, cluster weight and other characteristics. We could say that these results can offer an insight to the future improvement researches in regard to Loquat in the Black Sea.

REFERENCES

- [1] Karadeniz, T., 2005. Yeni Meyve Türleri, Ordu Üniv. Zir. Fak. Ders Notu
- [2] Ersoy, N., Kaynak, L., 2006. Yenidünya (*Eriobotrya japonica* Lindl.) Yapraklarında Farklı Fizyolojik Dönemlerde Belirlenen İçsel Zeatin Düzeyleri, Süleyman Demirel Üniversitesi Ziraat Fakültesi Dergisi 1(2):71-76
- [3] Bostan, S. Z., 1994. Bazı Kayısı (*Prunus armeniaca* L.) Çeşitlerinde Önemli Bazı Meyve ve Yaprak Özellikleri Arasındaki İlişkiler. YYÜZF Dergisi, 4: 55-66.

