



## **REVIEWING MORPHOLOGIC SPECIFICATIONS OF ACORN LEAVES AND FRUITS IN LORESTAN PROVINCE**

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### **Abstract**

Zagros forests, as the greatest jungle area of the country, are considered not only as a high-economic zone in wooden products, but also as a highly important zone in environmental values. It should be mentioned that acorn is one of the main elements in the forests of Lorestan, and grows on different ecologic conditions' realizing the variance-range of quantities and qualities aspects of leaves and fruits. This research has been done within the seven zones of Lorestan province's acorn forests. 40 samples of leaf and fruit have been gathered from various trees. For each sample, 8 morphological aspects of fruit, and 16 morphological aspect of leaf were measured and recorded. Received data were statistically analyzed by Minitab ver.14 software. Results show that there are three types of acorn in the province of Lorestan: *Quercus Persica* (Persian acorn), *Quercus Branti* (Broodar), and *Quercus Infectoria* (Darmazoo). The *quercus infectoria* can be seen separately on the zone of Zashat & Ghalai; two types of branti and persica can be seen irregularly. On Ghalai zone, due to the rain fall rate and more humidity in comparison to other zones, suitable conditions are available for the growth of *Quercus infectoria*. Among the reviewed aspects in this research, leaf color, the existence of fluff on leaves, existence of teeth, and the length of grain cover have the greatest effect on the separation of Persia and branti from infectoria.

**Keywords:** *Quercus persica*, *quercus infectoria*, *quercus branti*, Zagros forests

### **1. INTRODUCTION**

Disorders and problems of each matter attract more attention along with the increase of its importance (Mosadegh, 2004). Forest eco system, as the most complicated and an important ecosystem of the land, especially in the modern world, is not an exception to this rule (Jazirehee, 2003). After the growth area of Alborz, which forms the commercial forests of Iran, the growth area of Zagros has formed an important part of Iran forests on both quantity and quality values. Zagros forests, as the greatest jungle area of the country, are considered not only as a high-economic zone in wooden products, but also as a highly important zone in environmental values (Poorhashemi, 2004). It should be mentioned that acorn is one of the main elements in the forests

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of Lorestan, and grows on different ecologic conditions' realizing the variance-range of quantities and qualities aspects of leaves and fruits (Rahimzadegan, 2004).

Fatahi (1994) reviewed the acorn forests of Zagros, introducing the growth land of persica as mountain ramps and heights above 1670 meters. Sabeti (2003) introduces rush family in Iran as consisting of three types of rush, acorn, and chestnut growth in northern forests. Kafashzadeh *et al.* (2007) reviewed the morphological aspects of infectoria fruit of Kurdistan province forests, introducing the most variant attribute of the fruit as the length of fruit's grain and the least variant attribute as the length of grain. Kafashzadeh *et al.* (2008) introduced the most variant attribute of the leaf as the surface area of it, and the least variant as the number of veins.

## 2. METHODS

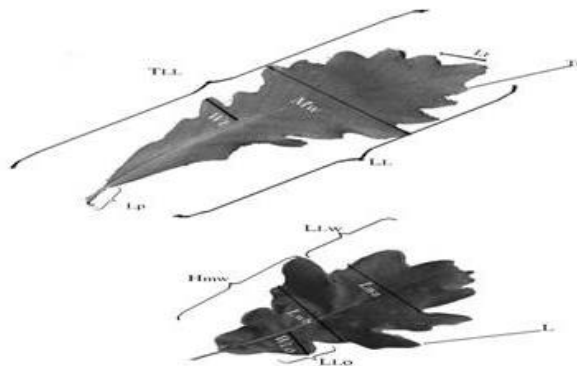
Lorestan, as a part of Iran's western lands, is affected by semi-Mediterranean climate (Marvi and Mohamad (2003). This area is divided into different climate zones regarding norms of annual rain fall rate. Northern and north-eastern parts have cold mountain climate, central and western parts have mild climate, and southern parts have warm climate. Normal annual rain fall rate is 620 mm. Maximum falls is during winter, and minimum fall is during summer. Minimum altitude is 1030 m., and maximum is 2640 m. Normal annual temperature is 31.1°C, and mean of minimum temperature in February is around -6°C. Maximum and absolute maximum temperatures are -14.6°C and 44.2°C. This research about Lorestan province acorn forests are fulfilled in four zones of Khoramabad, Alashtar, Noorabad, and Dureh-Chagni. In order to review the climate conditions of the studied zones, 20-year meteorological statistics of the nearest stations are used.

**Table 1: Climate aspects of the seven studied zones**

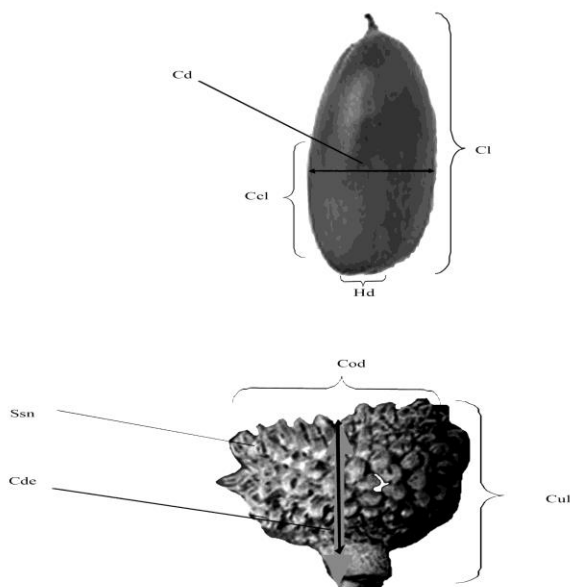
	Annual rain rate (ml)	Average temperature (°c)	Maximum temp. (°c)	Minimum temp. (°c)	Temp. average of the coldest month (°c)	Temp. average of the hottest month (°c)	Relative humid (%)	No. of frost days	No. of rainy days	No. of snowy days
Shoorab	507	17	47	-14	12	35	38	51	97	28
Dad Abad	475	19	49	-11	12	34	41	53	91	28
Maleh Shabanan	460	19	47	-12	12	35	41	48	93	29
Kahman	540	12	42	-21	10	32	47	71	108	31
Kaka Reza	482	13	40	-19	11	30	44	67	112	33
Zarin Chogha	525	14	41	-17	11	30	43	65	116	31
Zasht-o-Ghalaie	625	11	38	-27	7	27	52	91	124	43

### 2.1 Sampling technique

According to the existing data, the time of acorn blooming in Lorestan is from the second half of April until the end of May, and the season of fall starts from the second half of November till the end of the month. Northern and north-eastern parts have cold mountain climate, central and western parts have mild climate, and southern parts have warm climate. Normal annual rain fall rate is 620 mm. Maximum falls is during winter, and minimum fall is during summer. Disorders and problems of each matter attract more attention along with the increase of its importance. Forest eco system, as the most complicated and important eco systems of the land, especially in the modern world, is not an exception to this rule. In each sampling zone, 40 trees were chosen randomly. From each tree a small branch with leaf and fruit was gathered. Gathered data were statistically analyzed by Minitab ver. 20 software.



**Figure 1: Measured attributes of acorn's leaf: Length of petal (LP), Length of limb (LL), Total length of leaf(TLL), Maximum width of limb (MW), Maximum with from height (HMW), Base width of limb (LWB), width of limb from above(LWA), Minimum width length (LLW), Color of leaf (CLE), Puff (P), Number of lobes (NL), Length of lob (LLO), Width of lob (WLO), Tooth of leaf (TR), Length of tooth (LT), Width of tooth (WT)**



**Figure 2: Measure attributes of acorn's fruit: Length of grain (CL), Diameter of grain (CD), Diameter of naval (HD), Length of cup (CUL), Diameter of cup (COD), and Length of grain cover (CCL)**

### 3. RESULTS

After gathering samples in under-study zones, measuring desired attributes in leaf and fruit were done. Mean of each attribute in millimetres was identified, and then received measures about leaf attributes in the seven studied zones are as table 2.

**Table 2: Mean of measures in quantity attributes of leaf & fruit of acorn samples in the 7 zones**

	Dad Abad	Male shabanan	Shoorab	Kaka reza	Zarin chogha	Kahman	Ghalaie
LP	14	14.5	15	16	9	21	10.5
LL	96	100	70	94	110	85	79
TLL	83	114.5	85	110	120	106	90
MW	36.5	63	41	57	60	40	38
HMW	11	13.5	12	13	8	11	0
LWB	7.5	9	6.5	7	9	7	0
LWA	19	28	18	24	20	15	0
LLW	40	28.5	31	34	21	28	25.5
CLE	31.5	39	38.5	46	45	35	25.5
P	22	56	30	32	36	28	20
NL	56	44.5	39	60	75	57	53.5
LLO	0	0	0	0	0	0	8
WLO	0	0	0	0	0	0	9
TR	0	0	0	0	0	0	18
LT	1	1	1	1	1	1	0
WT	1	1	1	1	1	1	0
CL	35	36	38	28	32	38	29.2
CD	12	14	12.5	10	10	14	15
HD	4.5	3.5	4	2	5	5	6
CUL	17	13.5	15	12	15	18	17
COD	16	12	13	11	14	19	17
CDE	13	10.5	9.5	9	11	13	14
SSN	4	4	3	3	4	4	3
CCL	23	16	17	14	13	16	19

In order to identify the most important factors in separation of the seven sampling zones, breaking down of main categories of 24 variants of leaf and fruit attributes were done. Acorn is one of the main elements in the forests of Lorestan, and grows on different ecologic conditions' realizing the variance-range of quantities and qualities aspects of leaves and fruits. According to table3, 48.6% of changes were in first category, 21.8% in second, and 13.9% in third. First category consists of HMW, CLE, P, and NL; second one consists of MW, CUL, and CCL; the third one consists of LP, TLL, LLW, LT; The fourth one consists of LWB, CL, CD, and SSN; the fifth LWA, NT, WT, HD, and CDE; and the sixth one consists of LL and COD (table 4). In these table it is shown that some categories has positive coherence while the rest has negative coherence with other attributes of each category. According to table3, 48.6% of changes were in first category, 21.8% in second, and 13.9% in third. After gathering samples in under-study zones, measuring desired attributes in leaf and fruit were done.

**Table 3: Special amounts & percentage of variance for each category**

S. No.	Special values	Variance percentage	Congregate variance percentage
1	11.726	48.9	48.9
2	5.233	21.8	70.7
3	3.333	13.9	84.6
4	1.850	7.7	92.3
5	1.054	4.4	96.7
6	0.804	3.3	100.0

**Table 4: Amounts of special vectors related to variants for each category**

<b>Variant</b>	<b>1st</b>	<b>2nd</b>	<b>3rd</b>	<b>4th</b>	<b>5th</b>	<b>6th</b>
LP	0.124	-0.167	<u>0.405</u>	0.021	-0.322	-0.144
LL	0.001	0.340	-0.073	0.213	-0.008	<u>0.603</u>
TLL	0.180	0.132	<u>-0.364</u>	-0.187	-0.113	-0.108
MW	0.135	<u>0.311</u>	-0.215	0.244	-0.110	-0.053
HMW	<u>0.255</u>	-0.058	-0.204	-0.145	-0.200	-0.036
LWB	<u>0.232</u>	0.007	-0.236	0.248	0.169	-0.223
LWA	<u>0.158</u>	0.267	-0.094	0.299	-0.354	-0.088
LLW	<u>0.075</u>	0.267	0.314	-0.195	0.233	-0.312
CLE	<u>0.237</u>	0.032	0.168	-0.005	0.145	0.056
P	<u>-0.237</u>	-0.032	0.168	-0.005	0.145	0.056
NL	<u>-0.237</u>	-0.032	-0.168	0.005	-0.145	-0.056
LLO	<u>-0.237</u>	-0.032	-0.168	0.005	-0.145	-0.056
WLO	<u>-0.237</u>	-0.032	-0.168	0.005	-0.145	-0.056
TR	<u>0.255</u>	0.026	0.195	0.086	-0.288	-0.098
LT	<u>0.226</u>	0.074	0.323	0.080	0.002	-0.139
WT	<u>0.270</u>	0.133	-0.081	0.058	0.152	0.034
CL	<u>-0.201</u>	0.129	0.081	0.436	-0.00	0.289
CD	<u>-0.204</u>	0.086	0.131	0.464	-0.0103	-0.100
HD	<u>-0.212</u>	0.219	0.153	0.082	0.350	-0.002
CUL	<u>-0.135</u>	0.326	0.145	0.218	0.211	-0.168
COD	<u>-0.198</u>	0.206	0.216	0.068	0.133	-0.411
CDE	<u>-0.168</u>	0.294	0.089	-0.141	-0.308	-0.256
SSN	<u>0.098</u>	0.320	0.145	-0.379	0.107	0.057
CCL	<u>-0.013</u>	0.390	0.116	0.073	-0.330	0.200

In order to identify the most important factors in separation of the seven sampling zones, breaking down of main categories of some different variants of leaf and fruit attributes were done. Acorn is one of the main elements in the forests of Lorestan, and grows on different ecologic conditions' realizing the variance-range of quantities and qualities aspects of leaves and fruits. After gathering samples in under-study zones, measuring desired attributes in leaf and fruit were done. Mean of each attribute in millimeters was identified, and then received measures about leaf attributes in the seven studied zones are shown in figures.

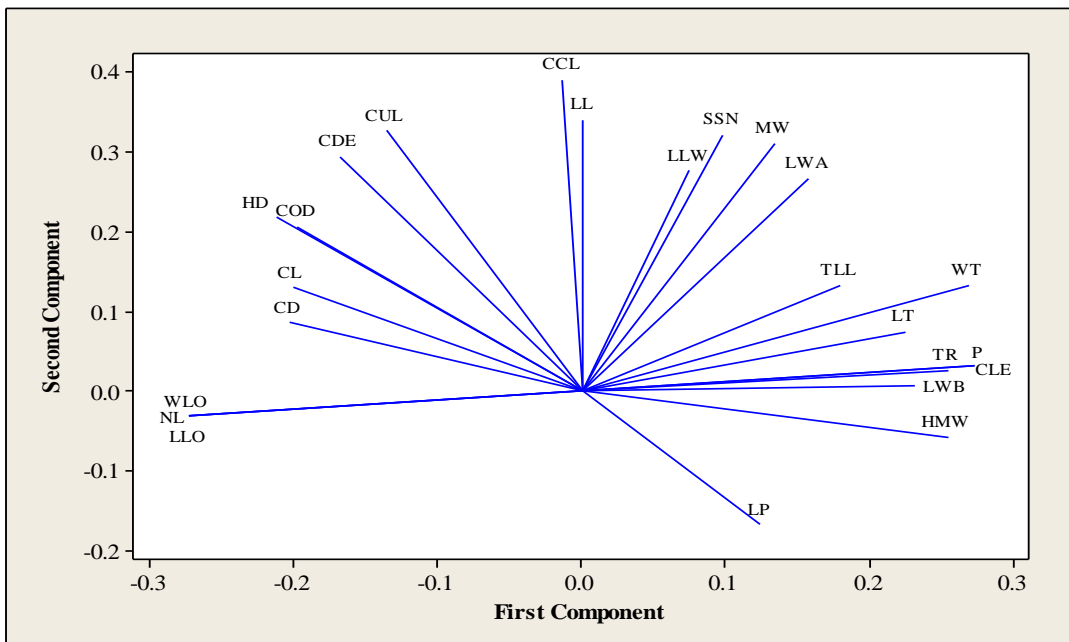


Figure 3: Graph of effective acorn leaf & fruit in the categorization of sampling zones

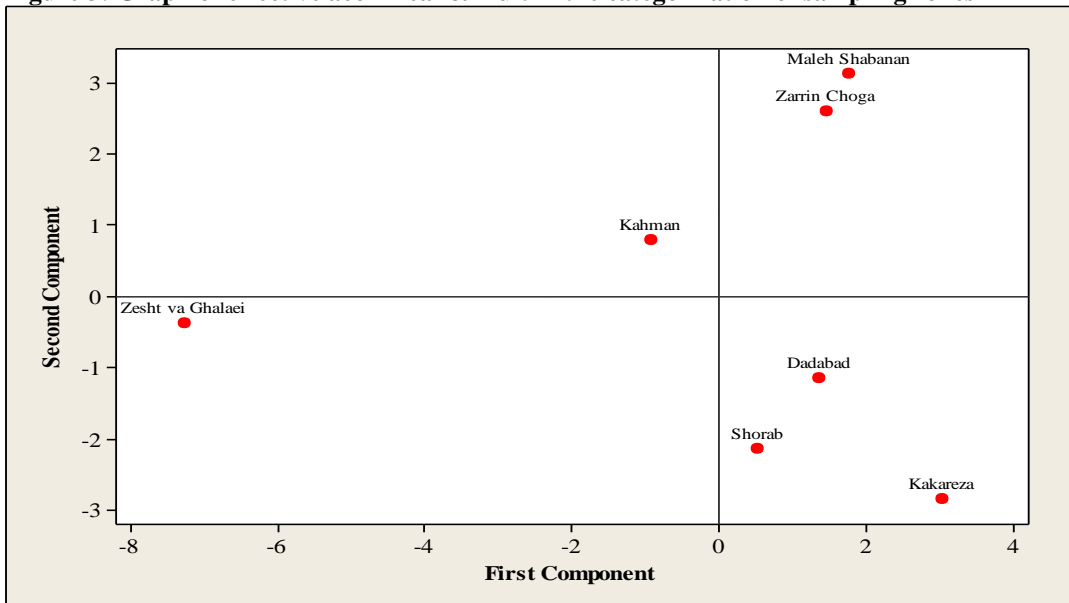


Figure 4: Graph of sampling zones categorization related to the variants of acorn leaf & fruit

In the cluster analysis based on morphological attributes of gathered samples from the seven zones, the most proximity (61.65%) relates to Zarin Chagha and Maleh Shabanan which formed the first cluster (figure 5). After them DadAbad and Kaka Reza has formed the 55.63%. Two zones of Kaka Reza and Shoorab are in the same cluster with 52.46% and 53.94%. Maleh Shabanan and Kahman have formed a bigger cluster with 49.56%. Zasht Ghalai and Kahman have formed the biggest cluster at the bottom of dendrogram because of the least proximity (25.55%).

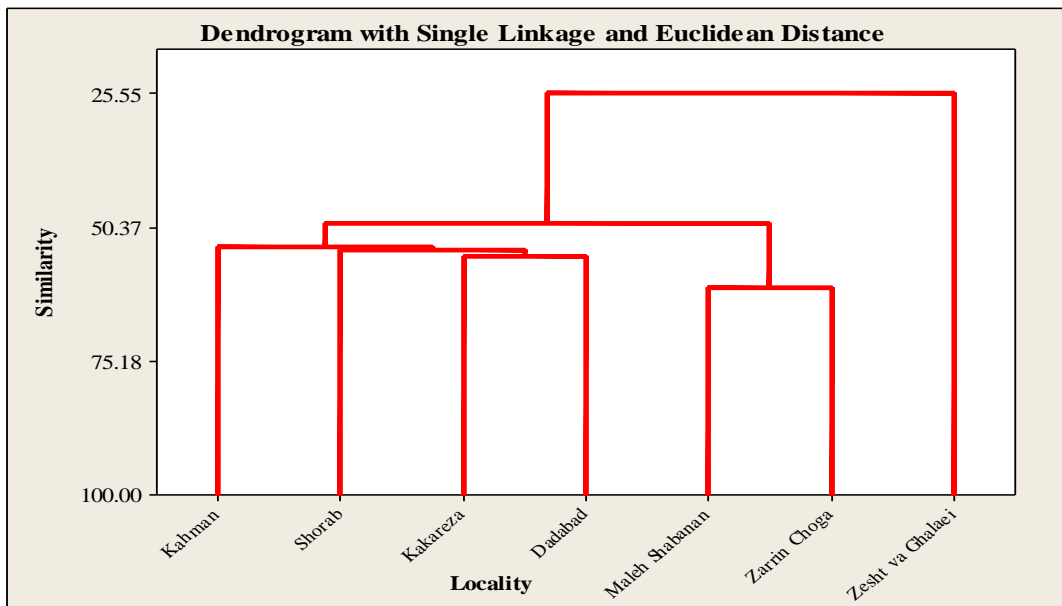


Figure 5: Sampling zones dendrogram based on morphologic attributes of acorn leaf & fruit of the seven zones

#### 4. DISCUSSION AND CONCLUSION

Results show that there are three types of acorn in the province of Lorestan: *Quercus Persica* (Persian acorn), *Quercus Branti* (Broodar), and *Quercus Infectoria* (Darmazoo). The *quercus infectoria* can be seen separately on the zone of Zesht & Ghalai; two types of branti and persica can be seen irregularly. On Ghalai zone, due to the rain fall rate and more humidity in comparison to other zones, suitable conditions are available for the growth of *Quercus infectoria*. Among the reviewed aspects in this research, leaf color, the existence of fluff on leaves, existence of teeth, and the length of grain cover have the greatest effect on the separation of persica and branti from *infectoria*.

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Quercus Persica (Persian acorn), Quercus Branti (Broodar), and Quercus Infectoria (Darmazoo). The quercus infectoria can be seen separately on the zone of Zasht & Ghalai; two types of branti and persica can be seen irregularly. On Ghalai zone, due to the rain fall rate and more humidity in comparison to other zones, suitable conditions are available for the growth of Quercus infectoria. Among the reviewed aspects in this research, leaf color, the existence of fluff on leaves, existence of teeth, and the length of grain cover have the greatest effect on the separation of persica and branti from infectoria. Two types of Q.Persica and Q.branti are mostly found in altitude between 1400 and 2000 m.

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