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## Initial Evaluation of a New Edible Wild Rhubarb Species (*Rheum ribes* L.) with a Modified Weighted Scaling Index Method

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**Abstract:** This study was carried out in order to evaluate a new edible wild rhubarb species (*Rheum ribes* L.), a partially commercial vegetable collected from the nature in Eastern and Southern Anatolia, Northern Iraq and partly Northwestern Iran in early spring. The study was conducted on the 104 rhubarb samples collected from the Yedi Kiliseler and the Cehennem Deresi countrysides of Mount Erek in Van province of Turkey. Weighted scaling included the flower stalk number, the flower stalk length, the flower stalk width and Soluble Solid Content (SSC) and pH of flower stalk with 30, 25, 25, 10 and 10% of their significance values of these criteria, respectively. According to results, 12 genotypes of Yedi Kiliseler countryside and 19 genotypes of Cehennem River countryside were selected and a collection plot was formed with these best genotypes at the Research and Application Farm of Horticulture Department of Yüzüncü Yıl University.

**Key words:** Edible, rhubarb, *Rheum ribes* L., collection

### INTRODUCTION

There are about 40 important major plants species recognized and cultured as vegetable in the world. However, there are much more minor plant species collected from the nature or cultivated and utilized as vegetable in various countries. *Rheum ribes* L. is one of the wild rhubarb species belonging to Polygonaceae and locally called ıřgın or ıřkın. It is existed in the nature with high altitude and away from the agricultural lands in especially Eastern and Southern Anatolia, Northern Iraq and partly Northwestern Iran<sup>[1,2]</sup>. There are few botanical studies on this wild rhubarb species and there has been no other study on its cultivability, collection and selection as a vegetable species.

Rhubarb is a perennial vegetable species spread from North and Central Asia to the other continents. It has also wild forms in Iran and Aotolia. It has been reported that there are 26 species in China<sup>[3]</sup>. *Rheum ribes* L. is the only rhubarb species grown from 1800 to 2800 m high rocky countryside of Turkey and has thick perennial rhizomes, annual large bean-like reddish-green leaves with stalks, edible flower stalks, yellowish small paniculated flowers, three-sided red winged seeds. It has been reported that its flower stalks have been consumed either cooked or raw and a brown dye has been extracted from its roots for the local carpet industry<sup>[1,4]</sup>. The upper parts of *Rheum ribes* L. plants can reach up to 150 cm and its flowers from June to July. Its seeds mature from July to

August. This wild rhubarb species whose plants can be grown in rocky soils at high altitudes of arid climate have hermaphrodite flowers pollinated by wind. Moreover, it is cross compatible with other *Rheum* species. It has been also observed that *Rheum ribes* L. prefers well drained medium or heavy structured soils and can also be grown in very clayish acidic or basic (alkaline) soils<sup>[2]</sup>. It resists to very cold weather and stays alive up to 20°C below freezing point. It can also be grown in regions having extreme conditions such as deficiency in illumination, arid or wet soils<sup>[2]</sup>.

There has no other study on the cultivation requirements of *Rheum ribes* L. therefore, it is assumed that these requirements might be similar to cultivated rhubarb which is not very choosy for soil except for too wet soils and whose optimal growth temperature ranges from 18 to 22°C<sup>[5-7]</sup>.

*Rheum ribes* L. has some medicinal properties such as preventing of stomach upset, vomiting, hemorrhoids, lessening the symptoms of diabetes, measles and smallpox and increasing appetite<sup>[1,2]</sup>.

Nowadays, *Rheum ribes* L., about which some limited information are available has been utilized as a local vegetable species by gathering from nature. Then, this study was carried out in order to evaluate and reveal some characteristics of this new edible wild rhubarb species, *Rheum ribes* L. and to establish a collection plot from the rhizomes of the selected genotypes.

**MATERIALS AND METHODS**

The study was conducted on the 104 rhubarb samples collected from different plants at the Yedi Kiliseler and the Cehennem Deresi countrysides of Mount Ereğ, about 1800 to 2000 m altitude during the period from April to October 2002, in Van province of Turkey. The plant samples collected from Yedi Kiliseler and the Cehennem Deresi countrysides were chosen based on the consumption habits in the region and their consequent market values and were classified as Type A and Type B, respectively.

These collected wild rhubarb samples were evaluated based on a modified weighted scale. Parameters of weighted scaling and their scaling values were formed for the first time because there has not been any research ever done before; weighted scaling included the flower stalk number, the flower stalk length, the flower stalk width and Soluble Solid Content (SSC) and pH of flower stalk with 30, 25, 25, 10 and 10% of their significance values of these criteria, respectively (Table 1 and 2). Total score for each genotype was calculated by the formulae given below<sup>[8,9]</sup>.

$$\text{Total score} = \sum_{i=1}^n (\text{criteria value} \times \text{significance level})$$

Where, n: each five criteria.

Wild rhubarb samples having more than 250 scale scores were chosen as the best ones and considered for future studies.

**RESULTS AND DISCUSSION**

The plants were found on rocky and stony mountain hills having 1800 to 2000 m altitude far away from the agricultural lands<sup>[2]</sup>. Plants color ranged from bright green to reddish-green in both regions. Plants had rough waxy large and bean-like leaves and initially short thick leaf stalks resembling flower stalks. After the development of flower stalks, leaf stalks continued to grow and reached up to approximately 100 cm. Plants had main strong taproots and thick rhizome stems. The perennial rhizome stems were green or reddish in color. Flower stalk development occurred soon after the developments of first leaves and flower stalks reached to the edible stage in a short period. Flower stalks were mainly green in color, but sometimes had slightly reddish-green pigmentation. Flower stalk number per plant ranged about 3 to 4 in average. The flower stalk length ranged about 35 to 50 cm in average.

As it was mentioned earlier, 104 wild rhubarb samples were evaluated based on a weighted scaling method and 31 genotypes having more than 250 scale scores were chosen as the best ones and considered for future studies (Table 3).

Table 1: Weighted scale criteria and their values for the wild rhubarb

Criteria	Values				
	1	2	3	4	5
Flower stalk number	≤2	-	3	-	4.0≤
Flower stalk length	≤30	31.0-41	41.0-51	51.0-61	62.0≤
Flower stalk width	≤2	2.1-2.3	2.4-2.6	2.7-2.9	3.0≤
SSC of flower stalk	≤4.5	4.6-5.0	5.1-5.5	5.6-6.0	6.1≤
pH of flower stalk	≤3.5	-	3.6-4.4	-	4.5≤

Table 2: Significance values of the weighted scale criteria for the wild rhubarb

Criteria	Significance (%)
Flower stalk number per plant	30
Flower stalk length (cm)	25
Flower stalk width (cm)	25
SSC of flower stalk (%)	10
pH of flower stalk	10

Table 3: Chosen genotypes based on the weighted scaling method and their scores

Genotypes	FSN*	FSL	FSW	SSC	pH	Total score
A19	150	50	75	30	30	360
A45	150	50	100	30	30	360
A30	90	75	75	50	30	320
A36	90	75	75	50	30	320
A46	90	50	100	30	30	300
A39	90	75	75	20	30	290
A06	90	50	75	30	30	275
A16	150	50	25	20	30	275
A42	90	75	50	30	30	275
A03	90	25	100	20	30	265
A13	90	50	50	30	30	250
A40	90	50	50	30	30	250
B06	90	75	125	50	30	370
B48	150	75	75	30	30	360
B20	90	125	75	30	30	350
B42	150	100	50	20	30	350
B11	150	75	50	30	30	335
B33	150	50	75	20	30	325
B43	90	100	75	30	30	325
B15	90	125	75	10	10	310
B27	150	50	50	30	30	310
B12	150	50	50	20	30	300
B16	90	50	100	30	30	300
B22	150	50	50	20	30	300
B35	90	50	100	30	30	300
B41	90	75	75	30	30	300
B45	90	75	75	30	30	300
B19	150	50	50	100	30	290
B21	30	75	125	30	30	290
B57	150	50	25	30	30	285
B58	90	75	50	30	30	275

\*: FSN= Flower Stalk Number per plant, FSL=Flower Stalk Length (cm), FSW= Flower Stalk Width (cm); SSC=Soluble Solid Content of flower stalk (%); pH= pH of flower stalk

Results shown that, Type A-19, Type A-45, Type A-30, Type A-36, Type A-46, Type A-39, Type A-06, Type A-16, Type A-42, Type A-03, Type A-13, Type A-40 genotypes of Yedi Kiliseler countryside and, Type B-06, Type B-48, Type B-20, Type B-42, Type B-11, Type B-33, Type B-43, Type B-15, B-27, Type B-12, Type B-16, Type B-22, Type B-35, Type B-41, Type B-45, Type B-19, Type B-21, Type B-57, Type B-58 genotypes of Cehennem River countryside were selected and a collection plot was

formed with these best genotypes at the Research and Application Farm of Horticulture Department of Yüzüncü Yıl University. Since the present study has been the first one dealing with the vegetable side of this new edible wild rhubarb, there has no other study to compare our findings. It has been hoped that the present study enlightens the future studies.

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