A NEW RECORD OF BETULA LITWINOWII (BETULACEAE) AND A REVIEW OF THE GEOGRAPHICAL DISTRIBUTION OF THE GENUS BETULA L. IN IRAN

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Betula litwinowii Doluch., discovered from northern Iran, is reported as a new record for the flora of Iran. Morphological characteristics of this species are compared to its closest relative, *Betula pendula* Roth. In addition, the geographical distribution of these two taxa in Iran and adjacent regions is discussed.

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Key words. Betula litwinowii, Betulaceae, new record, Iran.

گزارش جدید گونه Betula litwinowii و بررسی پراکنش جغرافیایی جنس توس در ایران

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گونه *Betula litwinowii* به عنوان گزارش جدیدی از شمال ایران نام برده می‌شود. ویژگی‌های ریخت شناسی این گونه با گونه نزدیک آن یعنی *B. pendula* مقایسه می شود. پراکنش جغرافیایی این دو گونه در ایران و مناطق مجاور نیز مورد بحث و بررسی قرار می‌گیرد.

INTRODUCTION

This paper is the outcome of a longer-term revision of the *Betulaceae* family for the project Flora of Iran (Assadi 1989). At present, there are about 60 species of *Betula* distributed in most parts of the northern hemisphere, among which *Betula pendula* Roth. has a wide distribution in Europe and Asia Minor (Krüssmann 1984). The distribution range of *Betula pendula* covers Europe, eastern Turkey, northern Iraq, northern Iran, western Siberia and Caucasia. Browicz (1972), in the Flora Iranica, family *Betulaceae*, reported *Betula pendula*, *B. tadzhikistanica* V. N. Vassil., *B. kunarensis* Browicz and *B. chitralica* Browicz. According to the present revision, of these, *Betula pendula* is the only species distributed in Iran with known occurrences in the Oshtorak valley, Toochal and Shahrestanak. The latter three species, with Asian origin, are not distributed in Iran. Sabeti (1976) reported *Betula pendula* from many habitats viz. Taleghan, Shahrestanak, at high elevations in Talar and western Azerbaijan. It seems that Browicz (1972) did not refer to any subalpine stand of *Betula* of the Hyrcanian region. Later, Browicz (1982, p. 27) stated that *Betula pendula* in Iran is "*very rare, and its few localities are located in the central part of the Elburz, in the province of Mazandaran (above 2000 m a. s. l.).*" Therefore, we found it necessary to carry out a detailed investigation on stands of *Betula* in the Hyrcanian region. Our investigation confirms the presence of

Table 1. Some important differences between the two *Betula* species in Iran.

Species	Juvenile shoots	Petioles	Leaves	Margin of leaves	Fruit wings	Geographical relevance
B. litwinowii	Pubescent with frequent glands, often sticky	Pubescent	Pubescent at first and then hairy on lower surface	Usually simple serrate	Usually 1-1.5 times broader than fruit	Usually on northern and southern slopes of Elburz Mountains
B. pendula	Glossy with glands or not	Glabrous	Glabrous and appearing glossy on both surfaces	Usually double serrate	2-3 times broader than fruit	Usually in mountains of northwestern Iran and in the Trans-Elburz Mountains

Betula litwinowii Doluch. in the area and this species is recorded for the first time for the flora of Iran.

RESULTS

Our revision of the genus *Betula* in Iran is based on field studies and herbarium specimens collected from Marmishoo (northwestern Iran), Taleghan, Shahrestanak, valley of Lar and Shahrood on the southern slopes of the Elburz Mountains (Irano-Turanian region), relatively large stands in the Hyrcanian region including Siahbisheh, Lasikooh, Yakhchalpesht and Dodangeh. Our survey showed that *Betula litwinowii* is generally distributed in Hyrcanian forests and is different from *Betula pendula*, which occurs rather in the Marmishoo valley (western Azerbaijan), the northwestern part of Iran, and in Shahrood, easternmost part of the southern slopes of the Elburz Mountains. In addition to ecological differences, the botanical characteristics are different and some of them are described here for *Betula litwinowii*.

Betula litwinowii Doluch. Fig. 1.

Tree, 7-15 m tall, bark of old trees whitish with sporadic horizontal gray lines; branches yellowish to reddish. Young twigs pubescent, usually with resin-glands. Petioles and young leaves generally pubescent, afterwards more or less pubescent beneath on veins, almost glabrous when adult or occasionally permanently downy. Fruit scale with short and broad lobes; fruit wings 1 to 1.5 x as broad as fruit.

Known distribution. Mazandaran: Sari, Sangdeh, 2600 m a. s. l., Assadi, 73639 (TARI). Sari, Sangdeh, Sarcheck, 2700 m a. s. l., Zare and Amini, 4716 (HNBG). Sari, Sangdeh, Naroo, 2650 m a. S. l., Djavanshir and Zare, 10637 (HNBG). Babol, Bandepeye Sharghi, Yakhchaleh pesht, 2470 m a. s. l., Zare, Ejtehadi, Mehdinia, 10168 (HNBG). Amol, Haraz road, Baladeh, Lasikooh, 2500-2600 m a. s. l., Zare, Rezaee and Naseri, 10612 (HNBG). Amol, Polour, Emamzadeh Ebrahim to Lar dam, 2550-2680 m a. s. l. Zare and Akbarinia, 4102 (HNBG). Chaloos, Chaloos valley, Daryabek, 2400 m a. s. l., Zare, Espahboodi and Khorrami, 10591 (HNBG). –Tehran: Lar valley, 2400 m a. s. l., Assadi and Saniee, 14115 (TARI).

The New key for the genus *Betula* L. in Iran

1. Fruit wings 2 - 3 times broader than fruit. Shoots, petioles and leaves glabrous or with hairs restricted to veins of the lower surface of leaves ***B. pendula***

- Fruit wings 1-1.5 times broader than fruit. Shoots petioles and leaves commonly pubescent especially juvenile leaves and shoots of seedlings or saplings. ***B. litwinowii***

Betula litwinowii is similar to *Betula pendula* and differences between the two species are shown in Table 1.

Habitat and Ecology. Betula litwinowii has a wide ecological distribution range from moderate and sub-xeric to humid conditions. It thrives on dry soils with little organic matter to soils rich in organic matter and humus and wet soils in some Hyrcanian forest sites. This species is resistant to a wide range of ecological conditions as found in the southern parts of Sari, Lasikooh and Poloor. *Betula litwinowii* with *Quercus macranthera* Fisch. et Mey. constitutes a special association named Querco-Betuletum generally above 2200 m a. s. l. Many woody plants such as *Sorbus aucuparia* L., *Carpinus orientalis* Miller, *Acer platanoides* L., *Acer hyrcanum* Fisch. & C. A. Mey., *Rhamnus cathartica* L. and others can be seen in this association (Zare 2002).

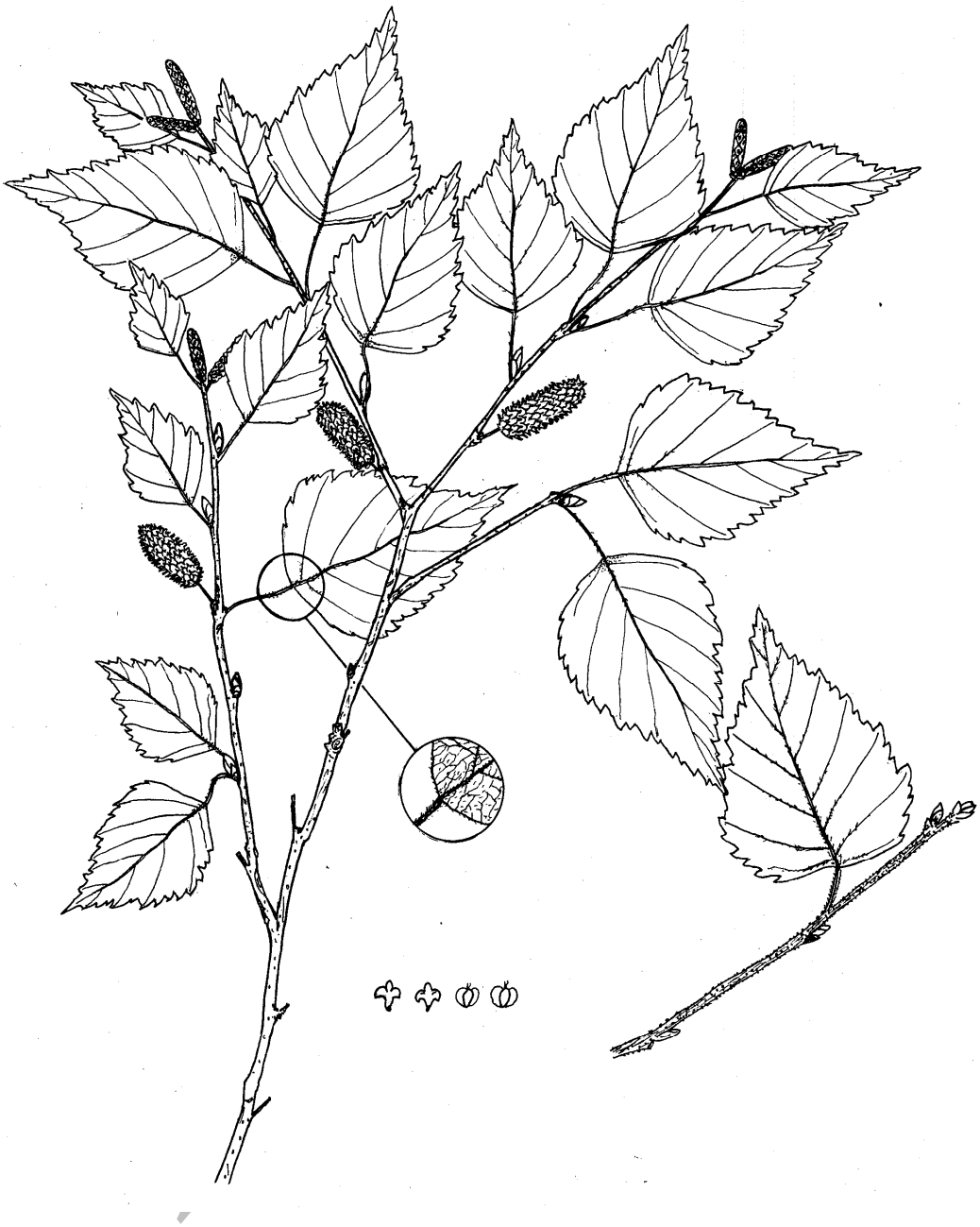
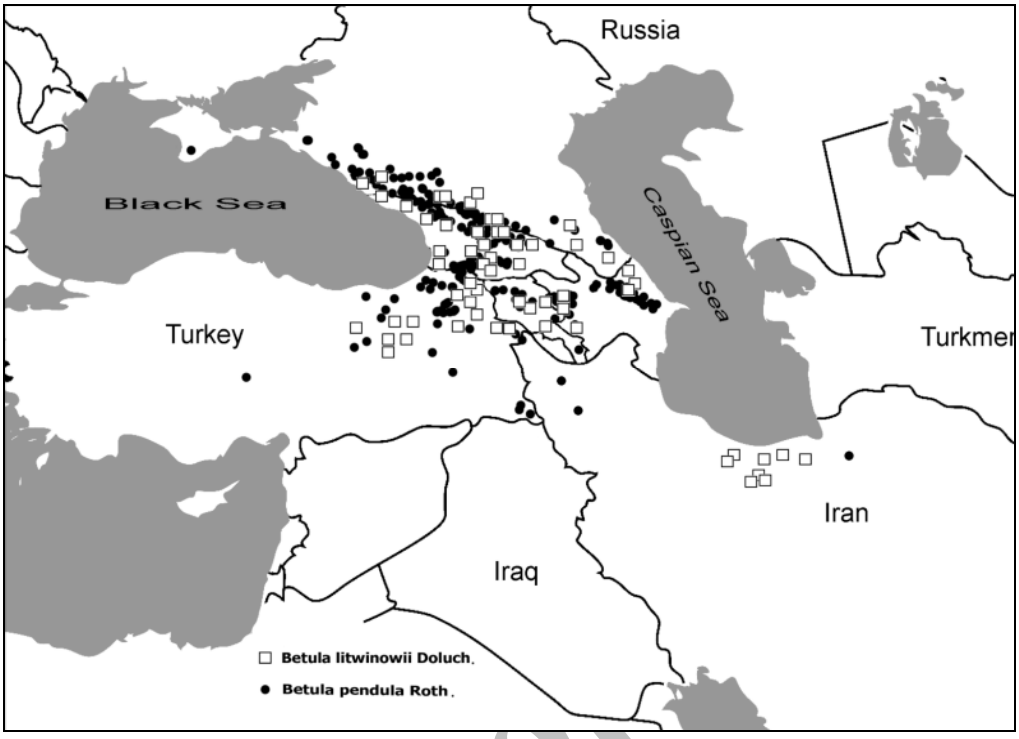


Fig. 1. *Betula litwinowii* (× 0.55); bracts (×1.2); fruits (×1,6).



Map 1. Geographical distribution of *Betula litwinowii* and *Betula pendula* in Iran and adjacent regions (the reference for the distribution of the species outside Iran is Browicz & Zielinski, 1982).

DISCUSSION

Taxonomy and biogeography

As noted in the results, fieldwork and study of herbarium specimens showed that *Betula litwinowii* is a distinct species from another species that was known previously from Iran (*Betula pendula*). *Betula pendula* is distributed in northwestern Iran (Marmishoo valley and Silvana; Zagros region and on the southern slopes of the easternmost Elburz mountains in the Shahvar mountain near Shahrood; Irano-Turanian region at 2750 m a. s. l., Herb. No. 78080, TARI). It seems that the distribution range of *Betula pendula* L. extends from eastern Turkey to the northern parts of Iran (Trans-Elburz Mountains). Based on the current knowledge, the distribution of the species within this range is rather scattered and consists of numerous disjunct populations. On the other hand, the distribution area of *Betula litwinowii* in Iran is on the northern and some of the southern slopes of the Elburz Mountains, especially in mountainous and subalpine forests of the Hyrcanian region (see Map 1). Further fieldwork will show whether there are morphologically intermediary populations between the Hyrcanian populations and the populations on the southern slopes of the Elburz.

Despite *Betula litwinowii* is a quite distinct species, it is worth mentioning that even if some overlap occurs between some of the characteristics, *Betula litwinowii* and *Betula pendula* are easily distinguishable based on the combination of the characteristics. *Betula litwinowii*, prior to this report, was only reported from the Caucasus region and eastern Turkey, and consequently was considered a so-called Euxinian element. Our new report of the species in the Hyrcanian forests confirms it as an Euxino-Hyrcanian element. *Betula pubescens* Ehrh. is another species similar to *Betula litwinowii*. As Yaltrik (1982) and Browicz & Zieleinski (1982) mentioned, this taxon has been reported from northeastern Anatolia as *Betula pubescens* Ehrh. but true *B. pubescens* does not occur here, nor does it in the Caucasus (Grossheim 1949). Specimens very similar in size and form of leaves to *B. pubescens* were discovered in northeastern Anatolia, yet though they are more or less pubescent or puberulent on veins beneath, they lack the axillary tufts so characteristic of *B. pubescens.*

Betula litwinowii is scattered in the Hyrcanian forests and in transitional zones between the Turanian and Hyrcanian phytogeographical provinces, generally above 2200 m a. s. l. (Zare, 2002). A number of highly competitive Hyrcanian woody angiosperms such as *Pterocarya fraxinifolia, Alnus subcordata, Acer velutinum, Diospyrus lotus, Gleditschia caspica,*

Parrotia persica, Acer cappadocicum, Fagus orientalis and *Carpinus betulus* limit the development and growth of *Betula litwinowii*, which is a light-demanding tree that does not grow very tall. Ecological requirements of *Betula litwinowii* in Hyrcanian forests are indicative of a stress tolerant species while its competitive ability is lower than in other species. Therefore, high altitude forests and transitional zones are most appropriate for the species' growth, survival and reproduction.

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