



**ARAŞTIRMA MAKALESİ / RESEARCH ARTICLE**

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**NEW LOCALITY RECORDS AND CONSERVATION OF CAUCASIAN WINGNUT  
(*PTEROCARYA PTEROCARPA* (MICHX.) KUNTH EX I.IIJINSK.) IN SOUTHERN  
TURKEY**

**ABSTRACT**

Caucasian Wingnut (*Pterocarya pterocarpa* (Michx.) Kunth ex I.Iljinsk.) is a fast growing tree species belongs to the Juglandaceae family. It is native to Turkey, Russia, Azerbaijan, Armenia, Georgia, Iran, and Ukraine. In Turkey, the species is mainly distributed in northern Turkey. Some relict small populations of the species are also seen in southern Turkey. In this study, eight new locality records in Adıyaman province are presented. These remote relict populations are on the verge of extinction due to recent intensive activities around the streams. Urgent studies and projects are needed for the conservation of these relict populations in the region.

**Keywords:** Caucasian Wingnut, *Pterocarya pterocarpa*, Relict, Conservation.

**YALANKOZ (*PTEROCARYA PTEROCARPA* (MICHX.) KUNTH EX I.IIJINSK.)'UN  
GÜNEY ANADOLU'DA BELİRLenen YENİ YAYILIŞLARI VE KORUNMASI**

**ÖZ**

*Yalankoz* (*Pterocarya pterocarpa* (Michx.) Kunth ex I.Iljinsk.) *Juglandaceae* familyasına ait hızlı gelişen bir ağaç türüdür. Doğal olarak Türkiye, Rusya, Azerbaycan, Ermenistan, Gürcistan, İran ve Ukrayna'da yayılış gösterir. Ayrıca relict küçük populasyonları Güney Anadolu'da görülmektedir. Bu çalışmada, Adıyaman'da yeni belirlenen sekiz yeni populasyon sunulmuştur. Ana yayılıştan uzak söz konusu relict populasyonlar yörede bulunan su kenarlarındaki yoğun faaliyetlerden dolayı yok olma tehlikesi sınırındadırlar. Yöredeki relict populasyonların korunması için acil çalışma ve projelere ihtiyaç bulunmaktadır.

**Anahtar Kelimeler:** Yalankoz, *Pterocarya pterocarpa*, Relikt, *In situ* koruma.

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## 1. INTRODUCTION

Caucasian Wingnut (*Pterocarya pterocarpa* (Michx.) Kunth ex I.Iljinsk.) is a monoecious tree species belongs to the Juglandaceae family. The tree grows to a height of 30-35m (Browicz, 1982; Efe and Alptekin, 1989). The species is a fast growing tree and generally with a large rounded crown. The pinnate leaves are relatively long, about 60-70 cm and the female catkins are about 40-50 cm in length with winged nuts.

*P. pterocarpa* is native to Turkey, Russia, Azerbaijan, Armenia, Georgia, Iran, and Ukraine (Yaltrık, 1998). In Turkey, the species is mainly seen in northern region including Kocaeli, Düzce, Zonguldak, and Samsun (Yaltrık, 1998; Kutbay et al., 1999). Relict populations of the species are also found in southern Turkey including Mersin, Kahramanmaraş, Gaziantep, Kilis, Batman and Siirt provinces (Avşar et al., 2004).

The species generally grows best on flat areas or shallow slopes in riparian moist streambanks (Sheykhoulislami and Ahmadi, 2009). The climate of natural distribution sites of this tree is mild winters and mild humid summers. It generally grows in mixed stands with other riparian species including *Platanus* spp., *Salix* spp., and *Populus* spp.

In this study, the main characteristics of unrecorded eight relict localities in southern Turkey were presented and the conservation strategies of these relict populations in the region were discussed.

## 2. MATERIALS and METHODS

In southern Anatolia, *P. pterocarpa* have been known in several locations. Eight new locations have been recorded in Adıyaman province during the past two years. New location records have been visited and the approximate lengths of the distributions along with the streambanks have been measured. For each location, coordinates, altitude, regeneration behavior, and the health conditions of the species have been recorded. The reasons about the persistence of these relict populations in these very extreme locations have been observed and discussed.

**Climate:** Adıyaman has mild winter and hot summer drought. The average temperature and total rainfall in Adıyaman were 17.2 °C and 707.3 mm, respectively (Table 1). According to Thornthwaite climatic classification, Adıyaman is semi-arid and less humid with hot summers (MGM, 2013).

## 3. RESULTS

For past two years, eight new relict populations of *P. pterocarpa* have been found in Adıyaman province in southern Turkey (Table 2). Three populations (Boğazözü, Örenli, and Ahmet Hoca villages) in Adıyaman central, four populations (Sugözü, Oyratlı, Çakırhüyük, and Sarıkaya villages) in Besni and one population (Dandırmaz village) in Tut are recorded.

*P. pterocarpa* populations in southern Turkey are located at a significant distance from the main distribution in northern Anatolia and Caucasia and characterized as relict isolated populations. These populations are very important relict gene sources and represent the extreme populations of the species. Similar to the extreme distributions of every plant, the trees of the populations are affected by various stress factors especially less runoff in the streams during the summer.

These isolated populations are quite stranded in narrow riparian banks of permanent streams (Figure 1). *P. pterocarpa* individuals are imprisoned in narrow strips along with the streams due to the prevailing summer drought in the region. These populations are under the threat of extinction due to intensive human activities around the streams and hot summer drought. In the region, the average temperature is higher, and summer drought is very common due to less and irregular rainfall.

Table 1. Climatic data of Adıyaman province, 1960-2012 (MGM, 2013).

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Average (°C) Total (mm)
Temp. (°C)	4.5	5.7	9.9	15	20.6	26.8	31	30.5	25.7	18.9	11.6	6.5	17.2 °C
Rainfall (mm)	133.9	102.8	89.6	66	40.4	7.4	1.0	0.7	5.1	44.5	75.6	140.3	707.3 mm



Figure 1. An isolated small population of *P. pterocarpa* in Boğazözü village, Adıyaman.

The distributions in the region are generally seen in the closed hidden sites. Therefore, the distributions are mostly intermittent throughout the streams dependent on the remoteness from the damaging agents such as agricultural uses, recreational activities, settlements, irrigation, and hydropower plants. On the other hand, The riparian forests of *P. pterocarpa* in Sugözü canyon is one of the best population in the region since the canyon provides a relatively suitable humid habitat for the species in the closed deep valley (Figure 2).

*P. pterocarpa* has strong vegetative reproduction capacity from stump sprouts and root suckers (Figure 3). Individual trees in these relict populations are mostly from stump sprouts and root sucker origins. They were treated as coppice stands for centuries and were used as fuel wood. Since the species is a fast growing tree, large trees with 40-60-cm diameters are commonly seen. None of these populations is protected. Therefore, regeneration from the seeds is not seen especially due to high empty seed percentage, grazing and recreational activities. The percentage of empty seed collected from two populations of the region in 2012 was higher than 90 %.



Figure 2. *P. pterocarpa* population in Sugözü canyon, Sugözü-Besni.

Many isolated populations in different locations and some intermittent distributions on the same stream imply that the dominance of these populations have been possibly replaced by other species. It is also predicted that these elimination trend will continue unless the strict conservation measures are implemented. The vulnerability of the populations is very high and the conservation studies should not be delayed.

Table 1. New locality records of *Pterocarya pterocarpa* in southern Turkey.

City, Town	Village, Location	Coordinates	Average Altitude (m)	Stream	Approximate length
Adiyaman, Central district	Boğazözü village	38° 23' 40" E 37° 51' 14" N	760	Boğazözü stream	1 km
Adiyaman, Central district	Örenli village, Pirin	38° 17' 49" E 37° 48' 20" N	660	Pirin stream	100 m
Adiyaman, Central district	Ahmet Hoca village	38° 13' 15" E 37° 49' 30" N	900	---	30 m
Adiyaman, Besni	Sugözü village, Sugözü canyon	37° 48' 30" E 37° 39' 16" N	740	Sugözü stream	8 km (intermittent)
Adiyaman, Besni	Değirmen stream, Around Oyratlı and Satlışağı village	37° 52' 34" E 37° 38' 32" N	665	Değirmen and Sofraz stream	10 km (intermittent)
Adiyaman, Besni	Çakırhüyük village, Tavaş	37° 48' 38" E 37° 33' 21" N	620	Tavaş stream	200 m
Adiyaman, Besni	Sankaya village, near Göksu stream	38° 08' 01" E 37° 32' 18" N	435	---	1 km
Adiyaman, Tut	Dandırılmaz village	38° 03' 18" E 37° 49' 11" N	725	---	200 m



Figure 3. Abundant amount of root suckers under a *P. pterocarpa* tree, Boğazözü village.

**Use:** Local people mainly use the *P. pterocarpa* trees for recreational purposes. Large tree crowns make intense shades around streamsides and these shades around water are very attractive for the outdoor activities especially during the hot summer months. Since the region is poor in terms of forest areas, the large trees of the species are also cut for firewood in spite of its low heat value.

#### 4. DISCUSSION

*P. pterocarpa*, a tree species of mild climate, is naturally occur in Caucasus, northern Anatolia, and southern shores of the Caspian Sea (northern Iran). Surprisingly, small relict populations are also seen in southern Anatolia. Euro-siberian plant species in southern Turkey, especially in Amanos mountains are generally explained by the connection with the Euxine province in northern Turkey and Caucasia (Davis, 1971; Kaya and Raynal, 2001). Similarly, *P. pterocarpa* in Adıyaman province may also be interpreted by the link between the region and Caucasia.

Since Adıyaman has a semiarid and less humid climate (MGM, 2013), this province is generally not an appropriate location for *P. pterocarpa*. Therefore, the species is stranded in adjacent areas of streamsides. *P. pterocarpa* in Adıyaman is under the extinction threat due to the intensive activities on the riparian streamsides.

In the region, many events on streams have been occurred including irrigation, hydroelectric power plants, and recreation activities. Any water cut from streams, even for a couple of weeks, may be detrimental for the species. Therefore, conservation projects and studies must be implemented without delay. The seedlings of the species should be produced and used in urban areas of Adıyaman especially for the public awareness and embracement of the species.

For many plants, vegetative regeneration provides persistence under extreme conditions (Held, 1983; Hara, 1987). Similar to the many relict woody plant populations, sprout regeneration in these relict distributions is attributable to the sustenance of the species in the region. High percentage of empty seed is common in the plants' marginal distributions (Peters 1997). This fact is also observed in the seeds of these extreme relict populations.

The marginal relict *P. pterocarpa* populations in Southern Turkey are important gene resources and sensitive to environmental impacts. Vegetatively regenerated forests cannot renew their abilities to adapt to changing conditions. Forests and trees are better adapted to changing environmental conditions with the improved genetic constitutions when they are regenerated from the seeds (Smith et al. 1997). These regional distributions under the effects of climate changes should be closely examined to acquire the knowledge about the behavior of the species under extreme conditions.

Before the extinction of these relict populations, the seeds should be collected and stored in the seed banks. The seedlings should also be produced and planted in order to restore the *P. pterocarpa* populations and to improve its adaption to new environmental conditions.

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