



An Allometric Growth Estimation of *Peganum harmala* L. Species Collected from Gilgit and Ghizir Districts of Gilgit-Baltistan, Pakistan

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Abstract: *Peganum harmala*, vernacularly named as ‘Ispandur’ in Gilgit Baltistan. Traditionally it used as folk medicine for relief of eye irritation and other inflammatory diseases. Its seeds are given to children to make them strong and brave. Pregnant women avoid using it because of its abortifacient effect. Research revealed that in its three months lifecycle its leaves grow 5.6 mm per day in Gilgit and 4.5 mm in Ghizir. The mean leaf length is 3.055 cm and width is 0.162 cm in Gilgit. Similarly, plants sampled in Ghizir showed 2.87 cm length and 0.13 cm width. Shoot grows 70.6 cm in average in Gilgit and 13.3 cm in Ghizir. Figures reveal rapid growth for relatively longer period in Gilgit (1480 m above sea level) contribute towards overall increase in size of plant as compared to plants grow in Ghizir (1850 m asl) which is at higher elevation. Both the sites selected were south facing. Mean temperature for June-August remains 23.5°C and 19.6°C in Gilgit and Ghizir respectively. Slow allometric growth is assumed due to relatively low mean temperature.

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Key words: *Peganum harmala*, *Zygophyllaceae*, antiviral, antibacterial, antitumor

1. Introduction

Peganum harmala commonly known as Syrian rue and Wild rue in a flowering plants and is widely distributed in the Central Asia, North Africa and Middle East. It has also been introduced in America and Australia. This plant is called as Harmal in North Africa and African Rue, Mexican Rue or Turkish Rue in America (**Mahmoudian et al., 2002**). It belongs to Zygophyllaceae family in the order of Zygophyllales that have about 22 genera and more than 250 species. *Peganum* species is commonly found in North Africa, Mediterranean, the Middle East, Pakistan, India and southern parts of Iran, and has been introduced in America and Australia (**Asghari and Lockwood, 2002; Ehsanpour and Saadat, 2002; Yousefi et al., 2009**).

Conventional propagation of *Peganum harmala* is from seed and it has several limitations, including germination (**Khawar et al., 2005**). Growing from a perennial woody rootstock, *Peganum harmala* is a bright-green, with dense leaves, herbaceous plant. Its stems with many branches may covers about four feet area, the plant is minimum two feet tall and generally appears round and growing thickly in habit. As an ornamental plant, this white flowering plant, is perfect, because of its low maintenance and drought tolerance (**Khawar et al., 2005**). Its leaves are two

inches long, born singly and finely divided into long narrow segments .Each year between June and August, *Peganum harmala* produces many single white attractive flowers measures one to one and one-half inches across, these relatively large and showy flowers have five oblong elliptic petals as well as five narrow sepals of slightly longer length. Each flower has the ability to develop into a fruit which is a leathery, three-valve seed capsule that stands erect on its stalk. Each capsule measures about three to eight inch in diameter and contains more than fifty dark-brown, angular seeds (**Zargari, 1988**).

People in the west Asia, burn the seeds to make smoke for keeping safe against voodoo (**Rojhan, 1982**). It cause Abortion in animals which ingest this plant in dry year (**Fathizad et al., 2007**). The fruits are used as painkiller and antiseptic in folk medicine.



Figure 1: *Peganum harmala* collected from Danyore.

For a long time, *Peganum harmala* has been used as a traditional medicine for treatment of various conditions, such as lumbago, asthma, colic, jaundice and as a stimulant emmenagogue (Bukhari et al., 2008). The seeds were known to contain hypothermic and basically hallucinogenic characteristics (Sharaf et al., 1997; Lamchouri et al., 1999; Fan et al., 1997).

From current pharmaceutical studies, additional pharmaceutical applications of *Peganum harmala* have revealed anti-tumor effect, insecticidal effect, curing malaria (Golet al., 2009), anti-leishmanial (Mirzaie et al., 2007), anti-spasmodic, anti-histaminic, vaso-relaxant effects (Asghari and Lockwood, 2002), wound healing, anti-oxidant activity, immuno-modulator properties, leukemia healing (Zakeretal., 2007), hypoglycemic effects (Singh et al., 2008), analgesic and anti-inflammatory properties, anti-nociceptive effects (Monsef et al., 2004), antitumor properties (Madadkar et al., 2002), hepato-protective effect (Khaled et al., 2008) and cytotoxic activity among others. Also, it has been reported that this plant had antibacterial, antifungal and antiviral effects (Darabpour et al., 2011).

The fruits of *Peganum Harmala* are the source of a red dye and oil (Bukhari et al., 2008). Alkaloid content of the unripe seeds is less than the ripe ones (Kartal et al., 2003).

2. Material and Method

Ten *Peganum harmala* plants were selected from different places of Golodass Punial, District Ghizer and Danyore Gilgit. From those plants 100 leaves (10 leaves from each plant) had been collected



Figure 2: First author during collection of plant specimens in the field, Danyore, Gilgit

to find the length and width. The leaves were place in

a shopper (separate shopper for the leaves of each plant), to bring them to the destination. After couple of days when the leaves were dried they were mounted on the white sheets for the measurement of length and width, with the help of ruler.

3. Results

Peganum Harmala complete its life cycle in three months. The calculations shows that the average growth of leaves of *Peganum Harmala* in Gilgit is 5.55mm per day and the average growth of leaves of *Peganum harmala* plants in Golodass Ghizer is 4.46 per day (Figure:3). The average stem length (figure: 5) is 70.6cm in Gilgit and 13.3cm in Golodass Ghizer in three months.

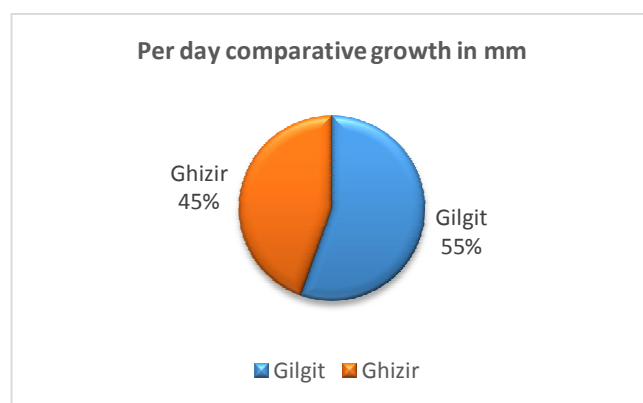


Figure: 3

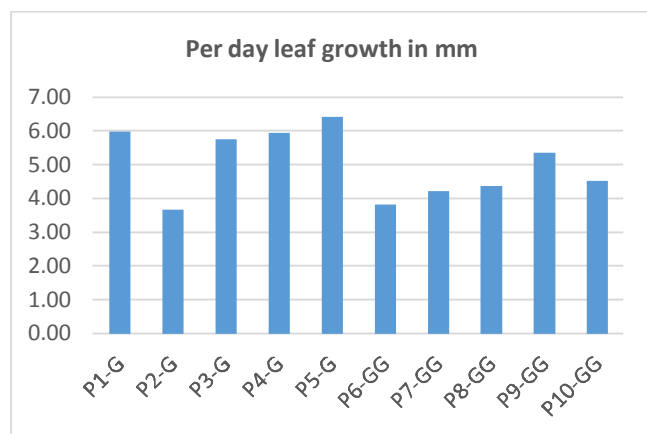


Figure: 3(B): Per day growth in mm

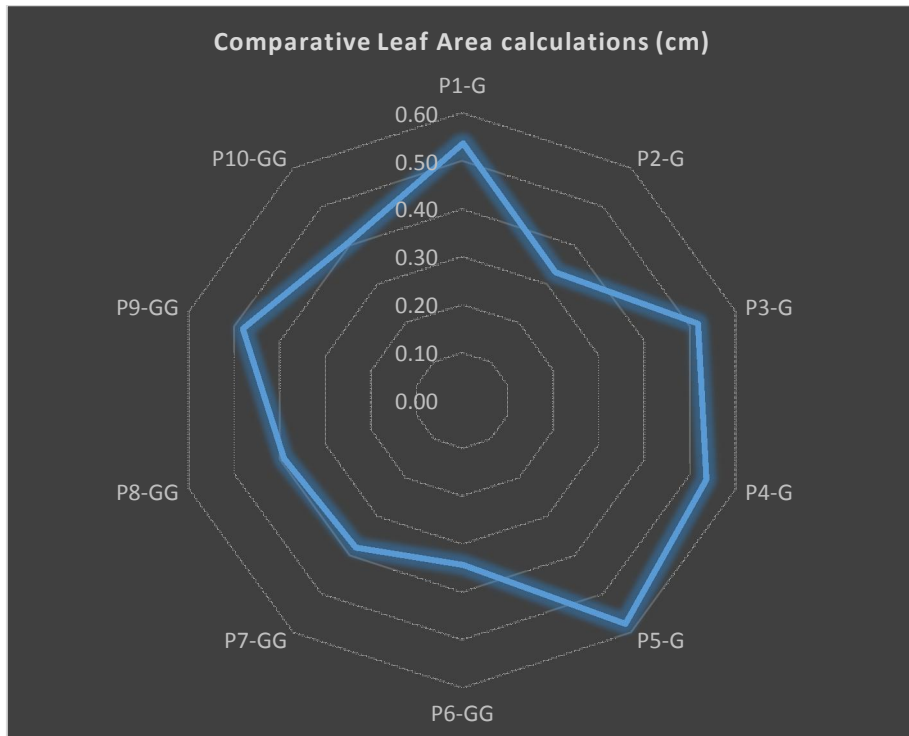


Figure: 4. Comparative leaf area calculations

G= Plants of Gilgit

GG= Plants of Golodass Ghizir

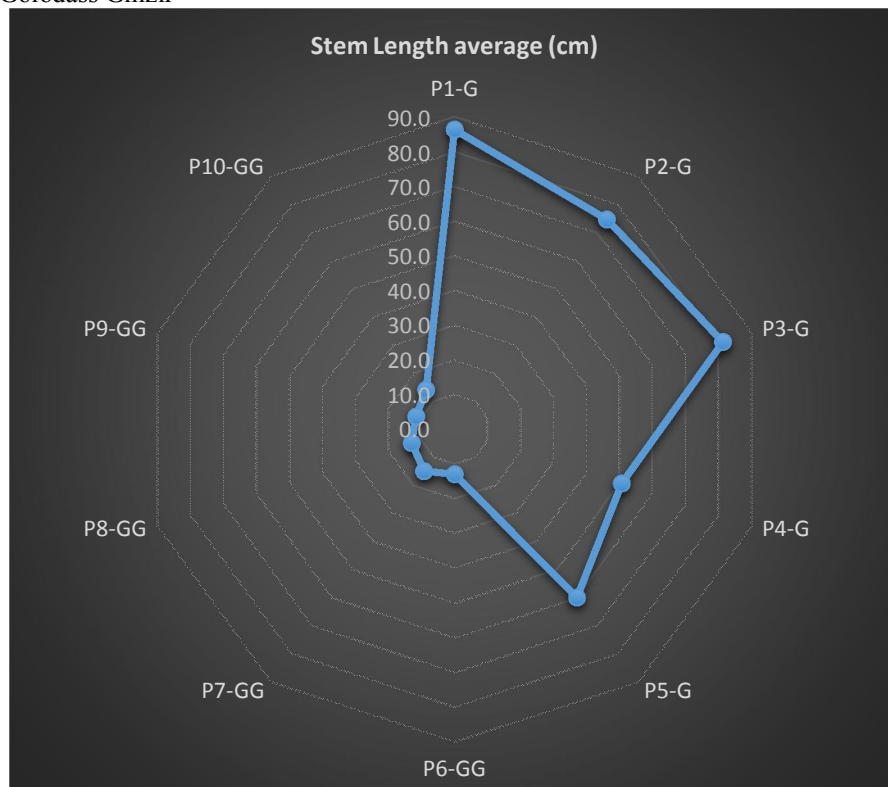
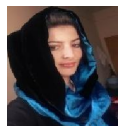


Figure: 5. Average stem length in cm

Discussion

Although *Peganum harmala* is found in different regions of Gilgit Baltistan but the growth rate vary from region to region. The comparative allometric calculations between the plants of Golodass Ghizir and Gilgit city shows that, Gilgit good for the cultivation of *Peganum harmala* than Ghizir. If anyone need large production of *Peganum Harmala*, they should use the land of Gilgit and it's near areas for the cultivation.

Acknowledgment/author biography



The first author of this research paper is a student of department of Biological Sciences (BS-Hons), Karakoram International University Gilgit-Baltistan.

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