

ALLOMETRIC GROWTH DYNAMICS OF ONION (*Allium Cepa*) SAMPLED FROM GILGIT-BALTISTAN, PAKISTAN



Munira Khan¹
Chandni Kiran²
Tika Khan^{3*}

^{1,2,3}Department of Biological Sciences, Karakorum International University,
Gilgit, Gilgit-Baltistan, Pakistan



(+ Corresponding author)

ABSTRACT

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Allium cepa, an Amaryllidaceous member traditionally used as anti-thrombotic, anti-platelet, anti-asthmatic, anti-biotic, anti-carcinogenic and anti-blood clotting. It also improves sleep quality, circulation, skin and hair maintenance, hair growth stimulant, heart ailments, blood pressure, lowers cholesterol. Study was aimed at growth dynamics of Onion in two districts of Gilgit-Baltistan i.e. Hunza and Gilgit. Research revealed that mean leaf length (cm), width (cm) and area (cm²) of plant collected from Hunza were 14.88 cm, 0.43 cm and 9.0 cm² respectively. In district Hunza leaf length grows 97.1 percent faster as compared to its growth in width and width increase is only 2.9% to the increase in leaf length. Similarly, plants collected from district Gilgit showed a mean values of leaf length, width and area as 25.05 cm, 0.59 cm and 10.1 cm² respectively. Average growth of leaf length in Gilgit is 97.64 percent (%) faster than its growth in width which is only 2.35%. this shows that growth in district Gilgit is relatively higher (12.70%) than in Hunza. Roots arising from the bulb have an average length of 0.40 cm in Hunza as compared to 0.44 cm in Gilgit. This shows minute difference between the two and samples from Gilgit show around 10% long. Adventitious roots grow almost 97.3% slow as compared to its leaves above the ground. Mean weight of bulbs collected from district Hunza was 9.62g as compared to average 16.25g in Gilgit. Bulb growth in district Gilgit is almost 60% (59.2%) faster as compared to Hunza leading to bigger and heavier bulbs in Gilgit. Mean values of Onion populations from both the districts show leaf length (19.97cm), leaf width (0.506cm), leaf area (9.55 cm²), root length (0.42) and weight (12.936).

Contribution/ Originality: The paper contributes the first logical analysis of Onion growth dynamics from the study area. There is no such a study has been carried out in the past, therefore, it will contribute into future studies.

1. INTRODUCTION

The Onion (*Allium cepa*) is most widely consumed vegetable in the world. Originated in Asia and traces date back to 5000 BC. Columbus introduced it to North America in 15th century. Iran and Pakistan are considered its primary center of origin [1]. There are more than 700 species in *Allium* genus [2]. Used in raw, dried, cooked and in pickles [3]. Global Onion production is 86.34 million tones and Pakistan ranks 8th with 2.25% share [4]. See figure 1. In Pakistan Sind province contributes 38.3% followed by Baluchistan (27.5%), Punjab (25.5%) and KPK (8.7%). See figure 2.

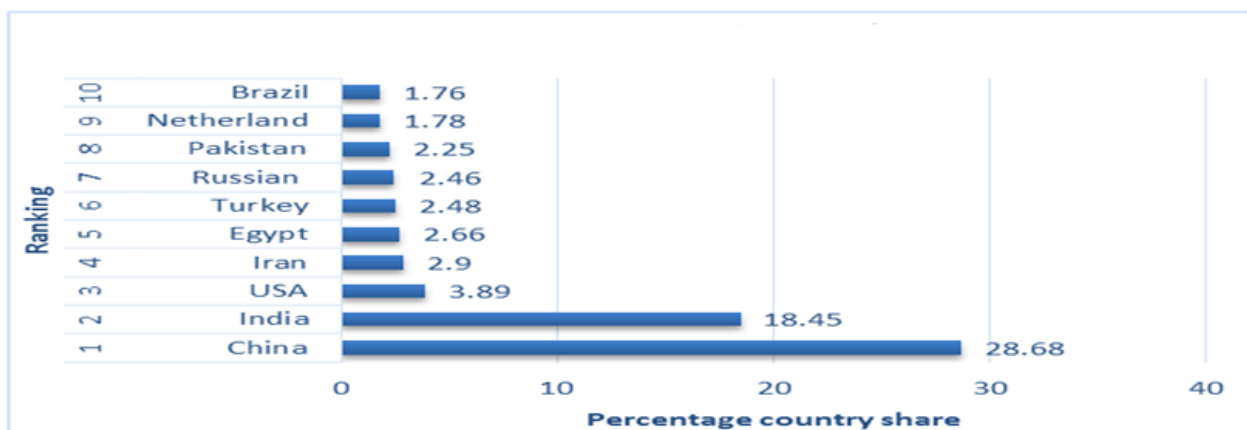


Fig-1. Onion production and top 10 countries

Source: FAO statistics 2016

Plants are perennial and produce 1 to 12 sessile, cylindrical, green, hollow, paralleled veined leaves arising from the underground stem [5]. They are low in calories and without fats and cholesterol. Besides containing carbohydrate, fiber, sugar, protein, manganese, vitamin C and B-6, calcium, iron, phosphorus, potassium, anthocyanin, antioxidant flavonoid quercetin [6]. One cup of chopped onion contains 64 calories, 15 grams of carbohydrate, 3 gram of fiber, 7 gram of sugar, 2 gram of protein and 10% vitamin C, vitamin B-6 and manganese [3].

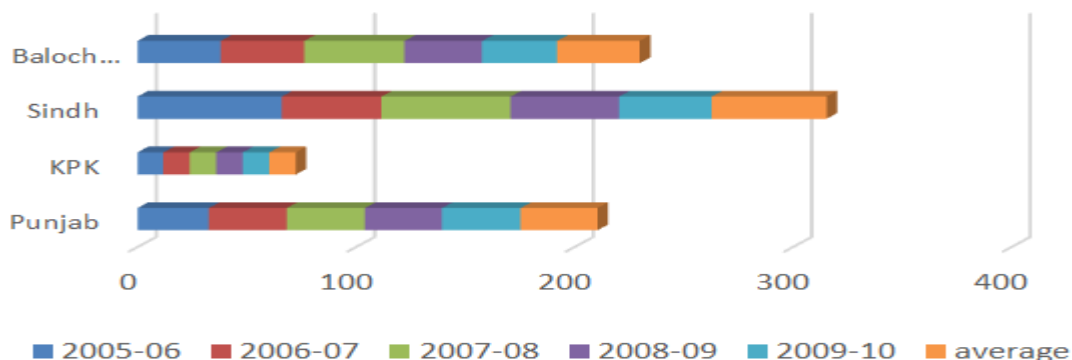


Fig-2. province-wise Onion production during 2009-10

Source: Pakistan Agriculture Council, Islamabad

Onion has anti thrombotic, anti-platelet, anti-asthmatic, Anti biotic, anti-carcinogenic abilities [7]. It improves sleep quality and circulatory system besides preventing blood clotting and helping skin and hair maintenance and stimulates hair growth [8, 9]. Onions are also used to treat diabetes but should never be taken on regular basis with anti-diabetic medicines due to its effect causing hyperglycemia. They are toxic to cattle, cats and dogs [10, 11]. It has anti-bacterial and anti-fungal properties, used for treating urinary disorders including relief for burning sensation during urination, sore throat, cough, pain caused due to honey bee bite, insects bites and scorpion stings. Chewing raw onions can kill the germs present in the mouth [12]. It increases bone density in human. According to American Heart Association onion prevents thrombosis and reduced hypertension. It is commercially profitable.

2. MATERIAL AND METHOD

Study was carried out in two district of Gilgit-Baltistan province including Gilgit and Hunza. Gilgit falls at 1400 m asl whereas district Hunza at an elevation of 2000 m asl. Agro-climatic condition varies across districts with hot and warm climate in Gilgit and relative cool and chilling in Hunza. Sample were identified in the field and were collected and transported to Karakoram International University, Gilgit. A total of two hundred (n=200) plants

were studied, hundred (n=100) from each district i.e. Hunza and Gilgit. Adventitious roots, bulb and leaves were taken into account to measure growth.

3. RESULTS AND DISCUSSION

3.1. Leaf

Mean leaf length (cm), width (cm) and area (cm²) of plant collected from Hunza were 14.88 cm, 0.43 cm and 9.0 cm² respectively. In district Hunza leaf length grows 97.1 percent faster as compared to its growth in width and width increase is only 2.9% to the increase in leaf length. Similarly, plants collected from district Gilgit showed a mean values of leaf length, width and area as 25.05 cm, 0.59 cm and 10.1 cm² respectively. Average growth of leaf length in Gilgit is 97.64 percent (%) faster than its growth in width which is only 2.35%. this shows that growth in district Gilgit is relatively higher (12.70%) than in Hunza. see figure 3.

3.2. Adventitious roots:

Roots arising from the bulb have an average length of 0.40 cm in Hunza as compared to 0.44 cm in Gilgit. This shows minute difference between the two and samples from Gilgit show around 10% long. Adventitious roots grow almost 97.3% slow as compared to its leaves above the ground. see figure 3.

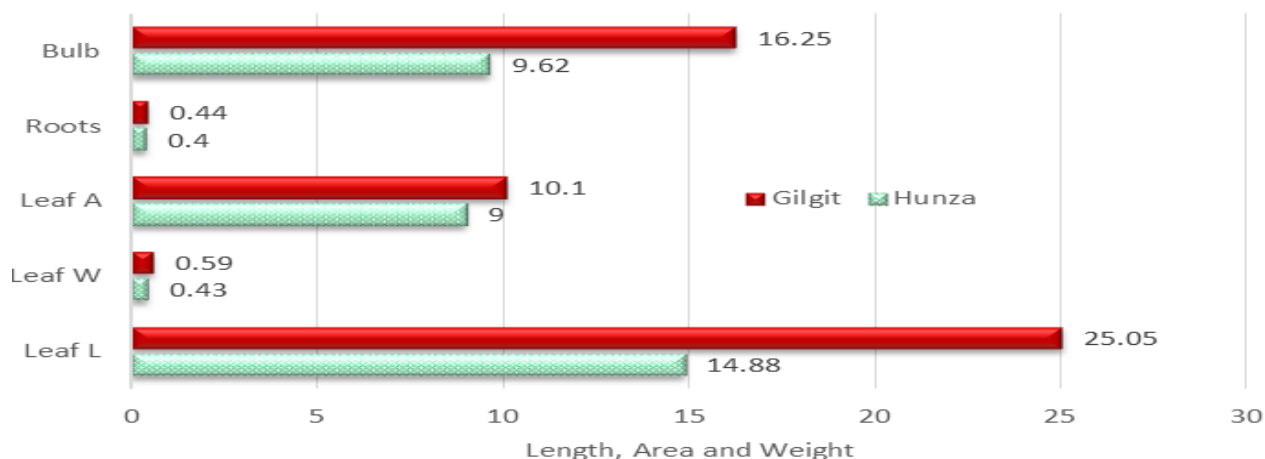


Fig-3. Comparative data on LL (cm), LA (cm²), Roots (cm), Bulb (g)

Source: Current research results

3.3. Bulb

Mean weight of bulbs collected from district Hunza was 9.62g as compared to average 16.25g in Gilgit. Bulb growth in district Gilgit is almost 60% (59.2%) faster as compared to Hunza leading to bigger and heavier bulbs in Gilgit. see figure 3.

3.4. Mean

Mean values of Onion populations from both the districts show leaf length (19.97cm), leaf width (0.506cm), leaf area (9.55 cm²), root length (0.42) and weight (12.936).

4. CONCLUSION

The study of *Allium cepa* (Onion) was designed to compare two regions of Gilgit-Baltistan i.e. Hunza and Gilgit. Onion is mostly cultivated in region because of favorable climate. During research Visited different regions of Hunza and Gilgit during the growing season of *Allium cepa* plant in the month of April to October. Based on the results this evident that there is slight differences between the two districts and both areas offer almost equal

opportunity to cultivate Onion. Farmer in Gilgit can cash more as compared to one in Hunza because of bulb mass which is relatively bigger and massive in Gilgit.

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