



## Effect of Sowing Date on Onion Bulb Production- A Review

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## ABSTRACT

Onion is thermo sensitive in nature and its growth and yield is very much influenced by temperature. Generally 10 and 30°C is good for healthy seedling production whereas 15 -25°C temperature is good during bulbing. Due to this reason sowing date plays an important role in onion cultivation. This paper studies the previous research findings of various authors regarding proper planting date for onion cultivation

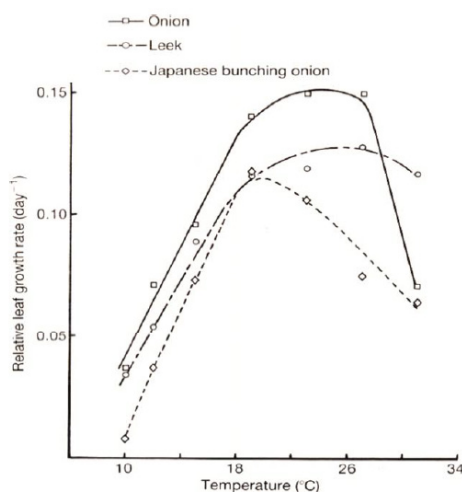
KEYWORDS : Onion, Sowing date, Growth, Bulb yield

**Introduction-** In terms of total annual world production, onion ranked second (after tomato), out of the total 15 vegetables listed by FAO (Pathak, 2000). Onion (*Allium cepa* L), is widely grown herbageous cross pollinated biannual monocotyledonous vegetable crop, comes under Alliaceae family, with diploid chromosome number (2n=16) (Bassett, 1986). In onion, new plant can be grown either from seed or bulb (Karim and Ibrahim, 2013). Onion has global importance (Hossain and Islam, 1994), and it is used not only as food but also for adding flavour and taste to food (Hamma, 2013; Bosekeng, 2012). It is rich source of vitamin C and E (Block, 2005; El Assi & Abu-Rayyan, 2007); and having medicinal value also (Kumar et al., 2010; Bosekeng, 2012).

Onion is a photo thermo sensitive plant (Jones and Mann 1963) hence planting time plays an important role in onion cultivation. So, it is important to know about the effect of planting time on onion cultivation to harvest better yield.

**Effect on Germination and Growth-**

In field condition, temperature range of 10 and 30°C is good for healthy onion seedling production with high germination percentage (Abu-Rayyan et al. 2012). For Iran late sowing accelerates seedling emergence Ansari(2007) and Bosekeng(2012), concluded that highest germination percentage and seedling emergence take place between 15 to 25°C temperature. Brewster (1994), reported that Relative Leaf Groth Rate per day (RLGR) is higher in the temperature range of 6 – 26° C (Fig. 1).



**Fig.-1: Relationship between RLGR with Temperature in different seedlings onion spices, grown under 12 hour day-length** (Brewster, 1994)

Onion development and growth rate is influenced by on environmental conditions like photoperiod and temperature to a great extent (Steer, 1980). Cool temperature (6 to 20°C) is required for early growth

and development of onion (Bosekeng and Coetzer, 2013). Hamma (2013), recorded superior results for both growth and yield characters for sowing at 15<sup>th</sup> October in Nigerian condition. Earlier researchers also established that sowing date has significant effect on most of the growth parameters of onion like plant height (Malik et al, 1999), number of leaves per plant (Hamma, 2013), foliage fresh weight (Kandil, 2013), number of flowering stalk number of umbels/plant, number of capsule/umbel, number of seed/capsule and seed yield/umbel (Malik et al, 1999, Jagtap et al., 2014, Mehri et al. 2015). On the contrary, Nayee et al. (2009) reported that, growth parameter like number of leaves per plant does not influenced by planting date. In the case of early planting, plant gets enough time and comparatively higher temperature, which induces maximum vegetative growth (Rabinowitch, 1990; Ud-Deen, 2008; Hamma, 2013).

Khokhar (2014) studied previous research works and concludes them as, a range between 5°C to 13°C is good for flowering in onion. Onion inflorescences for cv. "Rijnsburger was accelerated at an inductive temperature of 9°C, where the average time of initiation was 86 days 8 hours and 38 days in 20 hours photoperiods (Brewster, 1983). Bertaud, 1988, reported inflorescence emergence was fast in long days (14 hours) than short days (8 hours) at temperature of 20°C. Rohini and Paramaguru (2016), Krishnaveni et al. (1990), recorded influence of temperature in earliness of flowering seems negative. Planting time also influences maturity of crop (Jagtap et al., 2014).

**Effect on bulb yield**

The minimum temperature and photoperiod requirement for bulbing varies with different cultivar (Brewster, 2008) and due to the edaphic factor and environmental condition, transplanting date of onion seedlings widely varied region to region in terms of growth, bulb yield and bulb quality (Kandil, 2013).

Misra et al, (2014) reported in his paper that an optimum range of temperature 13° to 24°C before bulb formation and 16°C to 21°C during bulb formation and other studies concluded as warmer temperatures ranging from 25 to 27°C are required for bulb initiation and development (Comrie, 1997; Ansari, 2007). Long day-length is required for onion bulb production and maturation (Anonymous; cited in Karim and Ibrahim, 2013; Mohanta and Mandal 2014) as short day length prevailed in winter seasons (Ud-Deen, 2008). Onion development is very influenced by temperature and photoperiod (Boyhan et al 2009) and in delay planting, plant fails to become long enough to respond to photoperiod as a result, good bulb formation does not take place (Anonymous; cited in Karim and Ibrahim, 2013). If plants get favourable temperature and photoperiod properly, higher yield can be harvested (Rohini and Paramaguru, 2016). Good photosynthesis increases dry matter accumulation, bulb weight and hence the yield. This is happened due to proper sowing date supported by suitable weather condition, influences better foliage growth and canopy formation (Ansari, 2007; Patil et al. 2012 and Kandil, 2013). Late planting often confine required photoperiod for vegetative growth and as the temperature increases, plants start bulb formation, which leads poor bulb yield (Misra et al. 2014). Plants with early planting reported higher yield as all the yield attributing characters were influenced

by comparatively high temperature and long day length (Ud-Deen, 2008). Apart from these factors there are some other aspects through which planting date indirectly increases bulb yield. Long days with higher temperature suppress emergence of inflorescence and encourage rapid bulb formation (Holdsworth and Heath, 1950). Early planting helps the crop to escape from infestation of onion maggot (Brewster, 1994; Hermize, 2015) which decreases the probability of damaging the yield.

At the time when the plant is small, if the plant is stimulated for bulbing, leaves senescence starts and chances of small bulb formation increases (Wickramasinghe et al., 2000; Brewster, 2008). On the contrary, during bulb formation if the temperature become low (9 to 13°C) in early planting, plants starts bolting instead of bulb formation and apart from this, longer plants have the tendency of split or double bulbs production leading poor bulb quality (Comrie, 1997). So the determination of proper sowing date considering that region and cultivar is very essential it is very essential for onion bulb production.

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