



Blooming pattern and floral phenology of *Trachyspermum ammi* (Linn.) Spr.

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Abstract

Trachyspermum ammi (Linn.) Spr. (Ajmain) belongs to family Apiaceae, is an important spice crop, mainly cultivated for its seeds, which possess medicinal and commercial value. It is commonly grown in some parts of our country in the month of October-November and harvested in February-March. No any systematic work has been carried out on its blooming and floral biology. Therefore, the plant was selected for the present investigation.

Keywords: *Trachyspermum ammi*, floral biology, blooming pattern

Introduction

Flower is a reproductive part of phanerogams, which bears most conspicuous structure carpel and stamen. The importance of flower lies in its connection with the formation of new offspring's, which is a very manifest property of life. Floral biology recently developed into a full grown community science. After the eminent work of Percival, a number of scientists have paid attention towards the floral biology of angiosperm^[1-2].

Seasonal fluctuations in rainfall, temperature, and day length are the principal flowering restrictions in tropical habitats. Flowering patterns are shaped by seasonality, which is closely linked to plant community dynamics, defining temporal variations in plant reproduction, resource availability for flower visitors, plant-pollinator diversity, and plant reproductive. As a result, scheduling flowering during periods of ideal meteorological conditions may boost pollinator diversity and activity. Abiotic factors, such as plant-pollinator interactions, also influence flowering patterns. Pollinators exert a key selective stress on flowering, affecting the intensity, productiveness, and period of the reproductive season and also species' synchronicity. Flowers appeal to pollinators by distinct stimuli, such as colour, form, size, and heady scent. However, colour is the primary floral trait related to pollinator attraction and plant-animal communication; flower shade is tailored to pollinators' visual sensitivity and possibilities. As a result, the diversity of flower colours in angiosperms is specifically a consequence of the selective pressures exerted with the aid of pollinators^[2-3].

Trachyspermum ammi (Linn.) Spr. (Ajmain) belongs to family Apiaceae, is an important spice crop, mainly cultivated for its seeds, which possess medicinal and commercial value^[4]. It is commonly grown in some parts of our country in the month of October-November and harvested in February-March. Till date no any systematic work has been carried out on its blooming and floral biology. Therefore the present work was undertaken.

Methodology

The investigations pertaining to ecology and floral biology of *Trachyspermum ammi* (Linn.) Spr. were carried out in the field and laboratory. Following methods were adopted as suggested by eminent workers.

Blooming pattern and floral phenology

The time and duration of budding, flowering, wilting and fruiting of any plant is essential aspect in the study of pollination as they provide vivid knowledge on the activity of the visitor. The role of corolla, which is mainly related to attract pollinators, depends upon its structure, color and appearance. In some flowers a spot of different color on the corolla directs the insect to the interior of the flower, guiding the pollinators toward their destination.

The length of stamen and gynoecium also play an active role in pollen transfer. Besides these, flowers have other floral cues like nectar, sugar, odour and oil to attract the insects, which help in pollination. In some species, insect visit is directly related with plant height and also varies with size of the inflorescence. So the floral phenological study is an integral part of the pollination studies. Such studies were made with regard to floral bud growth, blooming period, floral morphology and number of flowers /plant as propose by Kaul^[5].

Floral bud growth

Anthesis is the duration from the appearance of a tiny floral bud to complete flower or it is the period during which a flower is fully open and functional. It may also refer to the onset of that period. The onset of anthesis is spectacular in some species. Anthesis of flowers is sequential within an inflorescence, so when the style and

perianth are different colours, the result is a striking colour change that gradually sweeps along the inflorescence. After the completed opening of flower, the days required was noted down and expressed in days ^[6].

Blooming period, floral phenology and floral morphology

Trachyspermum ammi is an annual, cultivated herb of winter season. The plant blooms during the month of November – January and anthesis occurs during the day. Stamens -5, polyandrous, alternates with the petals and arising from the epigynous disk, anther ditheous, introse, longitudinal and dorsifixed. The flowers are protandrous having a swollen, bilobed glandular nectar disk, The stigma is receptive during the time of flower open and remains whole day. The number of carpels are two, syncarpous, bilocular, axile placentation with one anatropous, pendulous, unitegmic ovule in each locule. The inferior ovary is tipped by a swollen, somewhat bilobed glandular nectar disk known as stylopodium. From each lobe of the stylopodium arises two short styles, ending to a capitate stigma.

Results and Discussion

The tiny bud was marked and its development through various stages was observed daily and the result are mentioned in table 1. The duration from the appearance of a tiny floral bud to its anthesis was divided into the following stages:

- In initial stage bud can be recognized as club shaped group of meristematic cells. At this stage there was no any differentiation of floral parts. This is a longest stage and requires 2-6 days in *Trachyspermum ammi*.
- Each group of cells soon broader and knob like bud is easily recognized. This stage requires 2-3 days.
- The petals start opening and stamen and carpel appear slightly and the stage requires 2-4 days.
- During this stage petals are separated and stamen and carpel increase in size. This stage requires again 2-3 days.
- This is the last stage of bud development where petals open. This is a short stage and requires 1-2 days.

Table 1: Floral bud formation in *Trachyspermum ammi*

Repl-icate	Stages and days required for the development of floral bud					Anthes Days (Average)
	1	2	3	4	5	
R ₁	4	2	3	3	2	14
R ₂	6	3	4	2	1	16
R ₃	5	2	2	3	2	14

R₁, R₂ and R₃ = Replicates 1,2 and 3

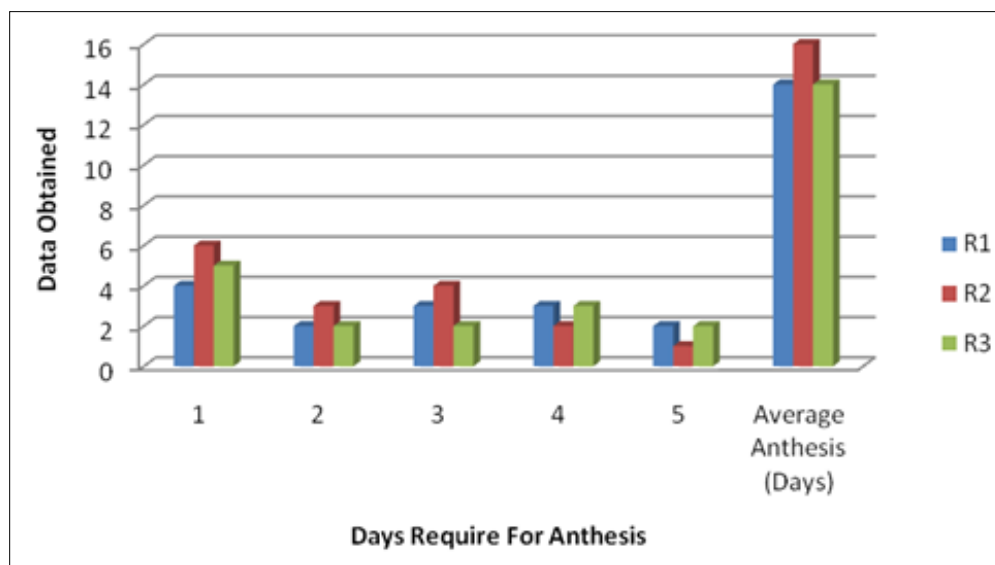


Fig 1: Floral bud formation in *Trachyspermum ammi*

Table 2 represents the number of flowers/plant. The data were obtained by the counting of flowers during the flowering months in the experimental fields. It is obvious from the table that average production of flowers/plant in *Trachyspermum ammi* was 2388 during the present investigation.

Table 2: Production of flowers/plant in ajwain (*Trachyspermum ammi*)

Study Period	Replicates			Mean
	R ₁	R ₂	R ₃	
2011-12	2357	2549	2298	2401
2012-13	2301	2513	1315	2376

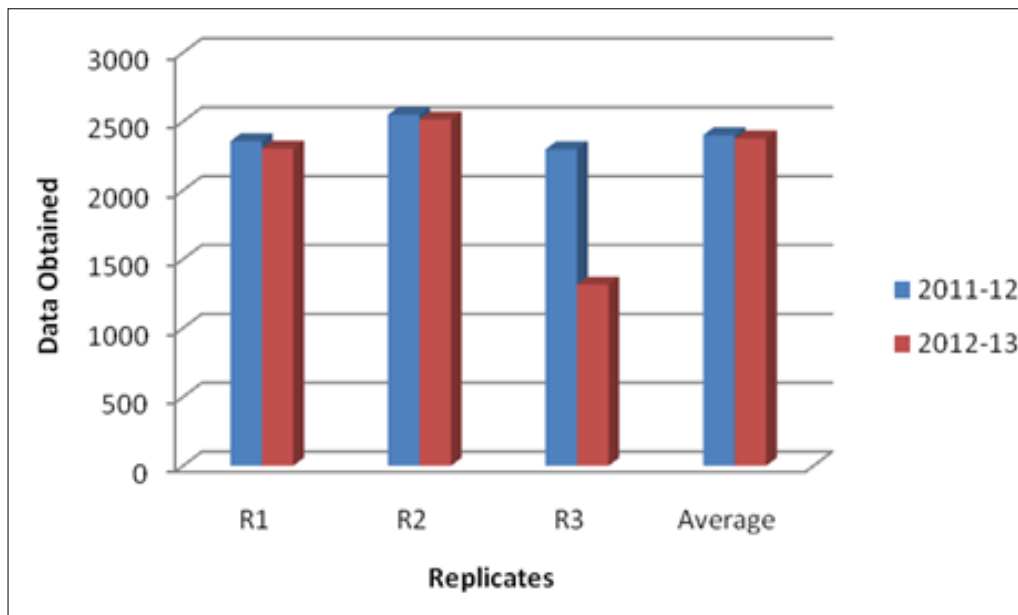


Fig 2: Production of flowers/plant in ajwain (*Trachyspermum ammi*)

Conclusion

Many factors influence the visitation spectra of flowering plants in a given location, the most prominent of which is the overlap between each species' flowering seasons. Because of this overlap, each plant species has unique morphological and physiological traits that attract different types of floral visitors. The establishment of "pollination syndromes" (based on flower colour, shape, odour, rewards, and breeding systems) supposedly adapted to specific types of pollinators has been based on this differential flower attractiveness, which has led to the establishment of "pollination syndromes" (based on flower colour, shape, odour, rewards, and breeding systems), supposedly adapted to specific types of pollinators. In the present investigation concludes that a floral bud required 11-14 days for the development of flower from a tiny bud during present study and an average 2388 flowers, 1896 fruits, seeds/ pant have been produced.

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