

Allelopathic effect of *Synedrella nodiflora* (L.) Gaertn on seed germination and seedling growth in Wheat (*Triticum aestivum* L.)

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Received: February 20, 2019

Accepted: March 29, 2019

ABSTRACT: : The present investigation was carried out allelopathic effects of *Synedrella nodiflora* (L.) on seed germination and seedling growth in Wheat (*Triticum aestivum* L.). The dried powdered leaves of *Synedrella nodiflora* were soaked in 1000 ml distilled water for 24 hours to obtain aqueous extract of leaves (20%). The seeds were treated with 5%, 10%, 15%, 20%, 25% and 30% concentration from 20% stock solution. The germinated seeds were counted after 7 days and root shoot length was measured after 7, 14 and 21 days. Relative allelopathic effect on seed germination, root and shoot length was calculated over control. The present investigation showed that the aqueous extract of *Synedrella nodiflora* leaves had inhibiting effects on seed germination. Relative percentage effect gradually increases as the concentration increases over control. It also had effect on root and shoot length.

Key Words: Allelopathy, Aqueous extract, Wheat

Introduction

A plant interacts with other plants to establish itself in new habitat and make community, subsequently disturbs the biodiversity. The plant produces some chemical compounds and release out into environment. This chemical compound shows positive or negative biochemical interaction between plants and weeds, and/or plants and microorganism through the production of chemical compounds that escape in the environment. Allelopathy is a complex phenomenon that depends on the concentration of allelochemicals. It has both inhibitory and stimulatory effects, which may be decided by concentration of allelochemicals present in extraction. The term allelopathy, from the Greek derived compounds allelo (mutual harm or suffering), was first coined and defined the term allelopathy. Weeds affect a growth by releasing allelochemicals into the growing environment.^{2, 3} Weeds are serious problem in agriculture fields worldwide most of the weed species have inhibitory effect on crops however some do exhibit stimulatory effects on crop by influencing germination, root, shoot length and other growth parameters. The allelopathic effect is an important mechanism for successful establishment of spreading of weeds. *Synedrella nodiflora* L. (family:-Asteraceae) is native of tropical South America are annual herbaceous weeds now a distributed all over India. The plants are growing up to 1 meter in height, foliage leaves are ovate to lanceolate and occur in a paired opposite leaf arrangement. The leaf surface and leaf stalk are covered in long white hairs, flowers small compound are composed of yellow ray florets. In the present investigation allelopathic effects of aqueous extract of leaves of *Synedrella nodiflora* L. on seed germination and seedling growth in Wheat (*Triticum aestivum* L.) were studied.

Materials and Methods

Synedrella nodiflora L was collected from the R.B.N.B. College Campus Shrirampur and shade dried 200g powdered leaves were soaked in 1000 ml distilled water for 24 hrs. This gave 20% aqueous extract. The extract was considered as stock solution and then a series of solutions with different dilution strength (5%, 10%, 15%, 20%, 25% and 30%) were prepared. The seeds of *Triticum aestivum* L. var Gw 496 were collected from Bombay super seed Ltd. The healthy selected seeds were surface sterilized with 70% ethanol for 30 second, followed by 0.2% mercuric chloride for 5 min. and rinsing several times with distilled water. The seeds kept in distilled water for overnight. These seeds were placed on a wet paper towel (ISTA RULE 1966) and the paper was rolled and towels are placed in containers containing 5%, 10%, 15%, 20%, 25% and 30% concentration leaf extract and tap water as control. Remove the towels After 7 days and seed germination percentage were calculated by using the formula (Germinated seed/ total seed × 100) for each replication of the treatment and measure root and shoot length after 7, 14, and 21 days. The length of roots and shoots were measured in centimeters. Seedling vigor index (SVI) was calculated according to the following formula⁴.

$$\text{SVI} = \text{Germination \%} \times \text{Radical length (cm)}$$

Result and Discussion

Table No.1:-Effect of leaf aqueous extract of *Synedrella nodiflora* on seed germination and seedling growth of Wheat (*Triticum aestivum* L.)

Concentration	Germination %	Root Length (cm. in mean)	Shoot length (cm. in mean)	SVI
Control	100%	11	9.5	1100
5%	96%	9.5	7.5	912
10%	90%	8.6	6.9	774
15%	90%	7.1	6.1	639
20%	80%	6.5	5.2	416
25%	80%	5.0	4.3	400
30%	73%	4.5	3.1	329
SE	3.65	0.89	0.81	109.86

Germination percentage

Table No. 1 indicate that, the highest seed germination percentage was recorded in control (100%) and the lowest was recorded at 30% aqueous leaves extract. Above result showed that, the aqueous leaves extract concentration increases it will affect the seed germination. Thus it indicates that, the aqueous leaves concentration increases which affect the seed germination. This showed that leaf extract of *Synedrella nodiflora* contained some inhibiting chemicals resulting in the reduced germination of Wheat (*Triticum aestivum*). Plants were releasing water soluble phytotoxin from leaves, stem, root, fruit and seeds. Such metabolites play an important role in delay or inhabitation of seed germination⁵.

Seedling Growth

Table- 1 showing maximum root length that (11cm.) and minimum (4.5 cm.) was recorded at 30% leaf extract. The shoot length also showed significantly decreases with increasing concentration as control. (Fig.1). Nganthoi, et al., (2014) and Thakur, G.S. (2017) also reported that increasing concentration of *Parthenium hysterophorus* showed inhibitory effect^{4,6}. Seedling vigor index (SIV) also decreases with increasing concentration of aqueous leaves extract of *Synedrella nodiflora* as compared to control. The maximum SIV was recorded (1100) at control and minimum (329) at 30% extract

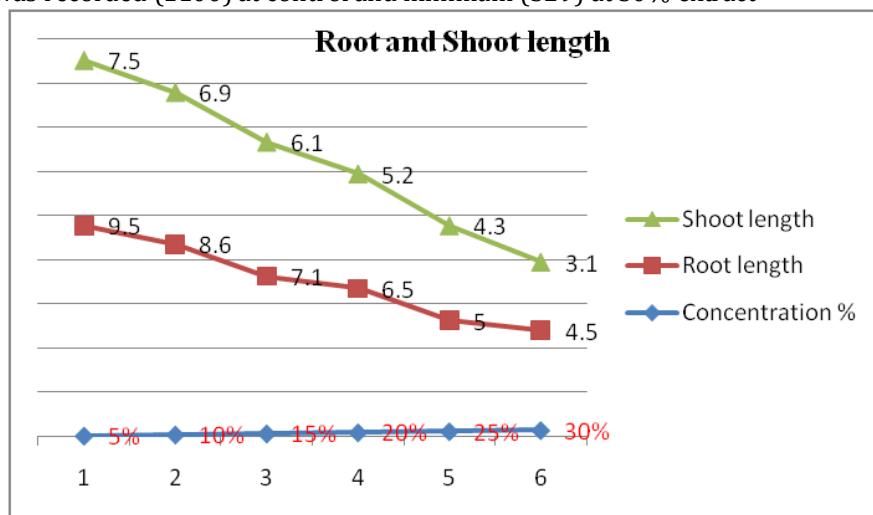


Fig.1 Root and Shoot length

Conclusion

In the present study demonstrated that different concentration of aqueous leaves extract of *Synedrella nodiflora* exhibited significant inhibitory effect on seed germination and seedling growth in Wheat (*Triticum aestivum*). It is concluded that, this weed should be eradicated at the emergence stage from the crop field, so that crop production may be enhanced.

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