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Research Article

EFFECT OF METHANOL EXTRACT OF *PASCALIA GLAUCA* ORTEGA ON WHEAT SEED GERMINATION STUDIES

[*]Ilahi Mujawar[1], Mahadev Kanade[2] and Chandrasekhar Murumkar[2]
[1]*Department of Botany, Smt. K.R.P. Kanya Mahavidyalaya Urun-Islampur, Dist.Sangli, Maharashtra, India*
[2]*Department of Botany, PG Research Center, Tulajaram Chaturchand College of Arts, Science and Commerce, Baramati, Dist. Pune, Maharashtra, India*
**Author for Correspondence*

ABSTRACT
Pascalia glauca Ortega is an obtrusive harmful lasting weed (Asteraceae), local to South America and broad in Argentina that recently settled in Walwa taluka in Sangli area of Maharashtra. The field overview watched that the presence of groups endured by it and can influence on associates. The fundamental point of present investigation was to research the allelopathic impact of methanol concentrates of *Pascalia glauca* Ortega stem leaves and flower on the seed germination and seedling development of wheat (*Triticum aestivum* L) under lab conditions. The seeds were treated with various concentrations of methanol extracts (5, 10, 15 and 20%) and perceptions were recorded on the fifth day of seed germination. The outcomes watched that the leaves extracts at higher fixation (20%) have more prominent allelopathic probability on seed germination (44.44%) than the stem (46.66%) and flower (60.00%). The root length was scaling down by 2.28cm in leaves, 3.62cm stem and in flower methanol extract measured 3.60cm while shoot length likewise hindered by 1.24cm length in leaves and 2.8cm in stem and 2.44cm in flower methanol extract at higher concentration (20%) as contrast with control treatment of root (9.50cm) and shoot (6.30cm). The dry weight was diminished 0.120mg at higher convergence of flower methanol extract (20%) then in leaves (0.123) and 0.153mg in stem extract. The level of diminishment was expanded with expanding in concentration of methanol extract.

Keywords: *Pascalia Glauca Ortega, Methanol Extract, Allelopathy, Wheat, Seed Germination*

INTRODUCTION
India is a farming nation and significant individuals till subordinate upon agribusiness products. Weeds are undesirable plants where they are not required that winds up plainly basic parts of biological system and known to have co-evolved with crops. They have compelling versatile ability to shifting ecological conditions, usage of assets and impregnable allelopathic blueprint. The weeds are generally belligerents' organic bug that hampers the development of harvests and is over enduring issue for our rural framework coming about misfortune in yield that blast-off in the cost of production (Mujawar *et al.*, 2017). In the greater part of the cases, they build up weedy monoculture cover in field. It is guessed that the achievement of the intrusive propensities of the weed are because of its allelopathic properties has been one of the conceivable technique has empowers them to colonize and prevailing the attack of invade eco-zone (Heirro and Callaway, 2003). They shoddily impact on crops, local species, grasses, pioneers and a few natural and manmade ecosystems (Rice, 1995; Singh *et al.*, 2001). They generally conceived when regular folks honed development for sustenance grains that contend with trim for light, space and basic minerals and at the same time discharge some substances show in an assortment of plant tissues including root, leaves, flowers, stems and even rhizome and seeds (Singh *et al.*, 2003; Ahmad *et al.*, 2011) called as allelochemicals (Batish *et al.*, 2010). They collaborate with different plants (Rebaz *et al.*, 2001; Shaukat *et al.*, 2002) that have either stimulatory or inhibitory thwacks on crops called allelopathy (Narval, 1994). Such smash relies upon their concentrations exhibit in the benefactor weed plant (Asuduzzaman *et al.*, 2010). Allelopathy engaged with numerous normal environments that assumes imperative part in development of plant groups and intrusion of extraordinary plants (Ridenour and Callaway, 2001).

Research Article

The wheat (*Triticum aestivum* L.) is real hotspot crop for grains, utilized as staple nourishment, by larger part of human populace as contrast with some other products (Siddiqui *et al.*, 2009). *Pascalia glauca* Ortega is one of the toxic weed that recently presented and attack in Islampur field zone of Sangli region of Maharashtra, India (Mujawar, 2013). It is notable as harming species to residential creatures and individuals (Collazo and RietCorrea, 1996; Soberero *et al.*, 2004; Mujawar *et al.*, 2016a, 2016b). Harmful species identified with dangerous chemicals that work as resistance against neighboring plants and winds up noticeably overwhelming. The poisonous quality is because of essence of hepatotoxic terpenoid caused intense deadly in brushing animals (Giannitti *et al.*, 2013) that capable inhibitor of cell respiration and ATP synthesis (Cost *et al.*, 2010). In this way, it progresses toward becoming need to discover allelopathic possibility of *P. glauca*, display work has been attempted to scrutinize allelopathic collision of stem, leaves and flower methanol extract on seed germination, development and dry weight collection of wheat.

MATERIALS AND METHODS

The experiment had been conducted under laboratory condition. The mature and fresh plant parts stem and leaves of *Pascalia glauca* Ortega were collected from the infected crop field of wheat washed, dried and were ground into fine powder then store separately in tight plastic jars. The protocol was adapted as per Veeraragavan *et al.*, (2016) with some modifications as per need of experiment. The 1grams of stem and leaves powder poured into 250 ml. capacity of conical flask containing 100ml of 80% methanol for 24 hours.

This conical flask put on rotary shaker machine for overnight then extract filtered through double muslin cloth which further filtered using Whatman filter paper No.1. This filtrate was evaporated to dryness using water bath, to evaporate the methanol trace and volume was made into 100ml with distilled water. This extract treated as stock solution (100%), further dilutions of 5%, 10%, 15% and 20% were prepared for treatments (Mujawar *et al.*, 2016b).

The healthy seeds of *P. glauca* Ortega were selected, procured from registered seed shop and sterilized with 0.1% mercury chloride solution then washed thoroughly with distilled water. The seed are treated with 5, 10, 15 and 20% concentrations of stem flower and leaves methanol extract in sterilized petri plates lined with two layers of filter paper in triplicates and irrigated as and when required with respected extracts. The distilled water served as control. The seed germination was counted up to 5^{th} days then after 5^{th} day germination of seeds, root and shoot length was measured. The five seedlings were randomly selected from each treatment for fresh and dry weight.

RESULTS AND DISCUSSION

The observe turned into done to investigate the influence of invader *Pascalia glauca* Ortega methanol extracts of stem, leaves and flower of different concentrations (5%, 10%, 15%, and 20%) on seed germination and boom of wheat (*Triticum aestivum* L.). The end result indicated that seed germination, root length, shoot length, seedling growth, fresh and dry weight of wheat seedling was substantially stamp out by using methanol extracts of *Pascalia glauca* Ortega as depicted in table 1**.**

Seed Germination Percentage: Biochemical adjustments were takes region throughout seed germination that offers simple structure for boom and development. The methanol extract of stem leaves and flower showed overpower impact on seed germination because of allelopathic interaction between allelochmical and biochemical metabolic activity of wheat and *Pascalia*. The leaf extract a great deal behind schedule seed germination percent (44.44%) within the 20% methanol extract even as the stem extract recorded 46.66% while flower extract have 60.00% seed germination. The degree of impediment increased as escalate the methanol extract in all treatments.

Root Length: The most root length inhibition (2.28cm) changed into takes in 20% leaf extract while 3.62cm in stem and 3.60cm in methanol extract of flower compared to the control (9.50cm). The step by step behind schedule the reduction of root length were in 5% (6.28, 8.16 &7.40cm); 10% (5.52, 7.42 & 7.12); 15% (4.48, 5.32 & 5.76) in the methanol extract of leaves, stem and flower respectively.

Shoot Length: The shoot lengths of wheat seedling became nearly decline (1.24cm) with growing attention (20%) of methanol extract of leaf and diminishing the increase of shoot (2.80cm) inside the stem extract and in flower extract with 2.44cm at higher attention (20%). The foremost formidable surveillance in present appraisal was the shoot length little stimulate in 10% concentration (6.48cm) in comparable to control (6.30cm).

Table 1: Treatments of Stem Leaves and Flower of *Pascalia Glauca* Ortega Methanol Extract of Different Concentrations on Wheat Seed Germination Percentage, Seedlings Growth and Dry Weight

Sr. No.	Parameters	Methanol Extract	Treatments				
			Control %	5%	10%	15%	20%
1.	Seed germination%	Stem		62.20	60.00	53.33	46.66
		Leaves	86.66	64.40	55.53	48.66	44.44
		Flower		77.73	71.06	66.66	60.00
2.	Root length (cm.)	Stem		8.16	7.42	5.32	3.62
		Leaves	9.50	6.28	5.52	4.48	2.28
		Flower		7.40	7.12	5.76	3.60
3.	Shoot length (cm.)	Stem		5.94	5.44	4.46	2.8
		Leaves	6.30	5.18	4.36	3.76	1.24
		Flower		5.76	6.48	4.72	2.44
4.	Seedlings growth	Stem		14.10	12.86	9.78	6.42
		Leaves	15.80	11.46	9.88	8.24	3.52
		Flower		13.16	13.60	10.48	6.04
5.	Fresh weight (mg.)	Stem		1.346	0.920	0.850	0.740
		Leaves	1.486	1.106	0.866	0.746	0.683
		Flower		1.393	1.060	0.850	0.750
6.	Dry weight (mg)	Stem		0.200	0.203	0.180	0.153
		Leaves	0.266	0.213	0.183	0.160	0.123
		Flower		0.226	0.150	0.170	0.120

*Means of three readings.

Dry Weight: Highest slimming of dry weight recorded in flower methanol extract (0.120mg) followed in leaves with 0.123mg and stem accumulated 0.153mg at 20% higher concentration as compare to control (0.266mg) which indicated that double scaling down and very surprisingly dry weight suppression more in flower and not in leaves extract, is most important outlook result in present investigation. Methanol extract of stem axing dry weight step to step at 5% with 0.200mg, 10% (0.203mg) and 15% with 0.180mg while leaves extract recorded 0.213mg in 5%, 0.183mg in 10% and 0.160mg in 15%. Methanol extract of flower cut back slow dry weight in 5% (0.226mg) as compare to control (0.266mg) then suddenly depletion in 10% (0.150mg) and in 15% (0.170mg).

The analysis of consequences confirmed meaty stifling of seed germination and seedling boom dynamics of wheat underneath impact of various concentration treatments of *Pascalia glauca* Ortega. Suppression in germination and not on time in boom due to its allelopathic compounds launched in methanol solvent, that intervene with primary skeleton and capabilities of tested species that acting additively or synergistically (Einhellig, 1996). The degree of inhibition decreases with increase in extracts concentration that exhibiting a sturdy reciprocal correlation with dose response relationship. The consequences of present work corroboratory with the findings of many well documented reports which include Zenab *et al.,* (2001); Tanveer *et al.,* (2012); Tanveer and Ayub (2001); Patel *et al.,* (2002); Wasim *et al.,* (2014) and Sharmin (2014).

Equal record displayed in extract of *Euphorbia genuculata* and *E. microphylla* which inhibited seed germination of wheat at better concentration (Ghodake *et al.,* 2012). Root, shoot elongation and biomass

accumulation had been drastically behind schedule in wheat by way of applying the methanol extract of various weeds from Nanded district (Dhole *et al.,* 2014). The numerous weeds affected seed germination and seedling boom of wheat stated time to time by way of specific workers which include Gupta and Mithal (2012); Dongre *et al.,* (2004) and Salgude *et al.,* (2015). The higher awareness degree of methanol extract of leaves, stem and flower of *Pascalia* attains allelopathic suppression because of solvent soluble phytotoxins launched whilst preparing the extract is coincidence in early stages of growth. Our results is helping to the work executed through Sobrero *et al.,* (2004) that *P. glauca* Ortega (*Wedelia glauca*) has allelopathic capability in germination and growth of tomato, cucumis and radish. Our outcomes acquired from gift research provide strong evidence that, the poisonous weed *P. glauca* Ortega have extra allelopathic ability in leaves than stem and flower.

The growth in concentration dose of extract strongly inhibited the seed germination (44.44%) and growth of wheat at the same time as the shoot length and root length is noticeably reduced in the leaf and stem in comparison to control.

The stunted and reduced seedling growth became correlated with biomass accumulation (Garcia *et al.,* 2002).

The dry weight of wheat was decreased inside the higher attention of leaves extract than stem and flower extract.

It indicated that, the leaves are primary supply of allelopathic chemical compounds. Therefore, *P. glauca* Ortega poisonous toxic weed as an important source of allelochemicals that has been enormous thing in studied vicinity for successive invading (Mujawar *et al.,* 2016) that showed marked competition for resources to suppress the growth of wheat crop.

Conclusion

Present investigation concluded that the leaves are the primary resources of allelochemicals launched by way of *Pascalia glauca* Ortega than the stem and flower. Consequently, present investigation recommended that to decrease the have an effect on of *P. glauca* on wheat the elimination of weed or apply a few eco-friendly methods inside the area earlier than sowing of crop.

REFERENCES

Ahmad S, Arfan M, Khan AL, Ullah R, Hssain J, Muhammad Z, Khan R, Khan N and Watanabe N (2011). Allelopathy of *Teucrim royeanum* Wall. ex Benth. from Pakistan. *Journal* of *Medicinal Plants Research* **5**(5) 765-772.

Asudduzzaman M, Islam MM and Sultana S (2010). Allelopathy and allelochemicals in rice weed management. *Bangladesh Research Publication Journal* **4**(1) 01-14.

Batish DR, Singh HP, Kaur S and Kohli RH (2007). Allelochemicals as a potential tool for weed management. *In: National Symposium on Plant Biology and Biodiversity* 54, (Jamia Hamdard, New Delhi, India).

Callazo L and Rits-Correa F (1999). Experimental intoxication of sheep and Cattle with *Wedelia glauca. Human Toxicology* **38**(3) 200-203.

Cost E, Zeinsteger P, Streitenberger N, Gimeno E and Fazzio L (2013). Accidental poisoning with *Wedelia glauca* (sunchillo) in a bull confirmed by analysis of rumen content. *Journal Revue de Medecine Veterinaire* **24**(2) 129-132.

Dhole JA, Lone KD, Dhole GA and Bodle SS (2013). Allelopathic effect of aqueous and ethanolic extracts of some common weeds on seed health of *Triticum aestivum* L (Wheat). *International Journal of Current Microbiology and Applied Sciences* **2**(6) 254-260.

Dongre PN, Singh PK and Chaube KS (2004). Allelopathic effects of weed leaf leachates on seed germination of blackgram. *Allelopathy Journal* **12**(1): 13-23.

Einhellig FA (1996). Interactions involving allelopathy in cropping systems. *Agronomy Journal* **88** 883-893.

Garci'a C, Moyna P, Ferna'ndez and Heinzen H (2002). Allelopathic activity of *Ammi majus* L. Fruit waxes. *Chemoecology* **12** 107-111.

Ghodake SD, Jagtap MD and Kanade MB (2012). Allelopathic effect of three *Euphorbia* species on seed germination and seedlings growth of wheat. *Annals of Biology Research* **3**(10) 4801-4803.
Giannitti F, Margineda CA, Cid MS, Montobbio C, Soteras CI, Caffacrena RD and Diab SS (2013). Fatal *Wedelia glauca* intoxication in calves following natural exposure. *Veterinary Pathology* **5093** 530-533.
Gupta A and Mittal C (2012). Effect of allelopathic leaf extract of some selected weed flora of Ajmer district on seed germination of *Triticum aestivum*. *Life Science Research Report* **2**(3) 311-315.
Heirro JL and Callaway RM (2003). Allelopathy and exotic plant invasion. *Plant and Soil* **256** 29-9.
Mujawar I (2013). *Wedelia glauca* (Ortega.) Hoffm ex Hicken (Asteraceae): Poisonous weed from Urun-Islampur of Sangli District of Maharashtra, India. *Indian Journal of Fundamental and Applied Life Science* **3**(1) 92-94.
Mujawar I, Kanade M and Murumkar C (2017). Allelopathic potential of *Pascalia Glauca* Ortega aqueous extract against seed germination and seedling growth of groundnut. *Bioscience Discovery* **8**(1) 35-39.
Mujawar I, Kanade MB and Murumkar CV (2016a). A review on *Pascalia glauca* Ortega as Poisonous Weed Barrier in crop fields of Sangli district of Maharashtra. *Proceeding of International Conference of "Plant Research and Resource Management* ISBN 978-81-924850-2-7. On 11-13 Feb., 2016 at T.C. College, Baramati Dist: Pune, Maharashtra, India, 181-183.
Mujawar I, Kanade MB and Murumkar CV (2016b). Investigation of allelopathic effect of *Pascalia glauca* Ortega on seed germination and seedling growth of wheat. *Indian Journal of Fundamental and Applied Life Science* **6**(3) 50-55.
Narwal SS (1994). *In: Allelopathy in Crop Production*, (Scientific Publishers, Jodhpur, India).
Patel B, Achariya B and Bupripata NP (2002). Allelopathic effects of *Eucalyptus* leaves on seed germination and seedling growth of winter wheat. *Proceedings of Indian Society of Allelopathy* 115-119.
Phiri C (2010). Influence of *Moringa oleifera* leaf extract on germination and early seedling development of major cereals. *Agriculture and Biology Journal of North America* **1**(1) 774-777.
Rebaz Z, Shaukat SS and Sidddiqui IA (2001). Allelopathic effect of *Anagalis arvensis* L.: A cosmopolitan weed. *Pakistan Journal of Biological Science* **4**(4) 446-450.
Rice EL (1995). *Biological Control of Weeds and Plant Diseases: Advances in Applied Allelopathy*, (Norman, USA, University of Oklahoma).
Ridenour WM and Callaway RM (2001). The relative importance of allelopathy interference: The effects of an invasive weed on a native bunchgrass. O*ecologia* **126** 444-450.
Salgude P, Pol M and Kanade MB (2015). Allelopathic effect of *Cuscuta reflexa* Roxb. On some physiological aspects in wheat. *Bionano Frontier* **8**(2) 179-181.
Sarmin NS (2014). Effect of *Morianga oleifera* on germination and growth of *Triticum aestivum* L. *Journal of Bioscience & Agriculture Research* **2**(2) 59-69.
Shaukat SS, Siddiqui IA, Khan GH and Zaki MJ (2002). Nematacidal and allelopathic potential of *Argemon mexicana*, a tropical weed. *Plant and Soil* **245** 239-247.
Siddiqui S, Bhardwaj S, Khan SS and Meghvanshi MK (2009). Allelopathic Effect of Different Concentration of Water Extract of Prosopsis Juliflora Leaf on Seed Germination and Radicle Length of Wheat (Triticum aestivum Var- Lok-1). *American-Eurasian Journal of Science Research* **4**(2) 81-84.
Singh HP, Batish DR, Kaur S and Kohli RK (2003). Phytotoxic interference of *Ageratum conyzoides* with *Triticum aestivum* L. *Journal of Agricultural Crop Science* **189** 341-346.
Singh HP, Kohli K and Batish DR (2001). Allelopathy in agro-ecosystems: an over view. *Journal of Crop Production* **4** 1-41.
Sobrero MT, Ochoa M, Del C and Chaila S (2004). Allelopathic potential of *Wedelia glauca* effect on horticultural species. *Plant Daninhas* **22**(1) 1-6.
Tanveer AR and Ayub M (2001). Competition effect of *Chenododium album* L. for Potassium and grain yield in wheat (*Triticum* aestivum L.) *Sultan Qaboos University Journal Science Research & Agricultural Science* **6**(1-2) 11-14.

Tanveer AR, Jabbar MK, Khaliq A, Matkiib A, Rana NA and Javaid MM (2012). Allelopathic effects of aqueous and organic fractions of *E. dracunculoides* Lam. On germination and seedling growth of chickpea and wheat. *Chilean Journal of Agricultural Research* **72**(4) 495-501.

Veeraragavan A, Sultan H and Ali SJ (2016). Phyto - Chemical Studies on the Leaves of Methanol Extract of Hyptis Suaveolens L (Poit.) from Nagapattinam District, Tamil Nadu, India. *Indian Journal of Applied Research* **6**(8) 589-591.

Waseem A, Akbar M, Farooq U, Alia A and Khan F (2014). Allelopathic effects of aqueous extracts of *Avena fatua* on seed germination and seedling growth of *Titicum aestivum* (var. GW-273). *IOSR Journal of Environmental Science, Toxicology and Food Technology* **8**(2) 38-42.

Zenab R, Shahid SS and Imran A (2001). Allelopathic potential of *Anagalis arvensis* L.: A cosmopolitan weed. *Pakistan Journal of Biological Science* **4**(4) 446-450.