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fungus as exhibited by both of the bacterial isolates indicates that, in light of environmental concerns and increasing cost of fungicides, these bacterial isolates may have potential as a biological control agent of *Sclerotinia* stem rot of *Brassica* in India.

Keywords: Sclerotinia, Stem Rot Disease, Mustard, Pathogenesis, antifungal activity

Growth Parameters of Direct-Seeded Rice as Influenced by Crop Establishment Methods and Zinc Fertilization

Sushil Kumar[*], S. K. Verma, Deepak Kumar Yadav and Peeyush Kumar Jaysawal

Department of Agronomy, Institute of Agricultural Sciences, Banaras Hindu University
Varanasi- 221 005 Uttar Pradesh, India
*Corresponding Author: sushilangrau@gmail.com

An experiment of direct-seeded rice involving three crop establishment methods (conventional till-direct seeded rice, conventional till-wet direct seeded rice and zero till-direct seeded rice)in the main plots and five zinc fertilization treatments [(control, 3 kg zinc ha^{-1} (basal application), 3 kg zinc ha^{-1} (foliar application), 6 kg zinc ha^{-1} (basal application) and 6 kg zinc ha^{-1} (foliar application)] in the sub-plots was undertaken in a split-plot design with three replications at Agricultural Research Farm, Institute of Agricultural Sciences, Banaras Hindu University, Varanasi during *Kharif* season of 2016-17. The growth parameters*viz.,* plant height, dry matter accumulation m^{-1} row length and the total number of tillers m^{-1} row length were recorded at 30, 60, 90 days after sowing and at harvesting stage whereas leaf count m^{-1} row length and leaf area index were observed at 30, 60 and 90 days after sowing. Results revealed that among crop establishment methods, conventional till-wet direct seeded rice observed higher plant height (40.94, 83.88, 108.26 and 108.54 cm), dry matter accumulation (38.41, 82.24, 182.23 and 194.45 g), total number of tillers (46.64, 71.90, 63.20 and 60.79) leaf count (146.09, 238.54 and 249.83) and leaf area index (1.41, 3.51 and 4.84) at all the crop growth stages. With respect to zinc fertilization, 6 kg Zn ha^{-1}(basal application) was found superior over rest of the treatment and recorded higher plant height (41.34, 83.98, 108.43 and 108.81 cm), dry matter accumulation (41.41, 81.68, 180.16 and 190.77 g), total number of tillers (40.51, 74.39, 66.56 and 64.90) leaf count (147.95, 234.98 and 246.11) and leaf area index (1.41, 3.43 and 4.73) at all the crop growth stages. Based on the results, it is concluded that conventional till-wet direct seeded rice and 6 kg Zn ha^{-1} (basal application) was found to be better for growth parameters of direct-seeded rice.

Keywords: Crop establishment methods, Zinc fertilization, Direct-seeded rice, Growth parameters, Conventional tillage, Zero tillage

Computational Resources for the Modeling Biding Affinity of Steroids to Sex Hormone-Binding Globulin (SHBG)

Vishal M. Balaramnavar[*]

*Global Institute of Pharmaceutical Education and Research, Kashipur, U.K., India

The circulating endogenous steroids bound to a highly specific sex hormone-binding globulin (SHBG) and in lower-affinity to the proteins like the corticosteroid-binding protein and albumin in vertebrate including fish are transported in the bloodstream. The xenobiotics are primarily released in the aquatic environment, there is a need to evaluate the binding affinity of xenosteroid mimics on fish SHBG, especially on Zebrafish (*Danio rerio*), a small freshwater fish originating from India, which is widely used in ecotoxicology, toxicology, and genetics. Previously we developed a homology model for the zebrafish SHBG (zfSHBG) using human SHBG (hSHBG) receptor structure where the interactions with amino acids viz. Ser-36, Asp-59 and Thr-54 were important for binding affinity. This model in addition to the HipHop based pharmacophore model well differentiated between zebrafish binders and non binders. Thus this approach may be a useful tool in the identification of anthropogenic compounds inhibiting zfSHBG and may augment the consciousness of vulnerability posed by existing commercial chemicals at relatively low cost. The study was also empowered by pharmacophore based virtual screening a (PBVS) and structure based virtual screening (SBVS) protocol followed for 50000 compound library which resulted in the identification of novel compounds which may be placed in the category of environmentally vulnerable and are identified as environmental pollutants due to their affinities to the targeted proteins.

Keywords: Danio rerio; Zebrafish SHBG; Ecotoxicology; Homology modeling; Molecular docking; Pharmacophore modeling