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Collar rot and web blight caused by *Rhizoctonia solani* Kuhn in vegetable cowpea (*Vigna unguiculata* (L) Walp.) and its organic management

Sivakumar Vavilapalli, Celine V A and Girija V K
Kerala Agricultural University, India

Vegetable cowpea (*Vigna unguiculata* (L) Walp.) is one of the most popular and nutritious leguminous vegetable traditionally grown in the humid tropics of Kerala. Though the crop is gaining importance with the farmers, it is attacked by many fungal, bacterial and viral diseases. Among the diseases, collar rot and web blight caused by *Rhizoctonia solani* Kuhn is the most serious soil borne disease in Kerala due to environmental conditions like high temperature and humidity causing severe yield loss. This ubiquitous fungus is highly virulent in cowpea causing stand loss and subsequent yield loss. Collar rot is most severe at seedling stage and web blight is severe at vegetative stage. As it has wide host range, it is difficult to develop disease resistance. The collar rot is characterized by oval or spindle shaped brown-black lesions having length ranging from 0.2-8 cm at soil level near collar region, girdling the basal portion of the stem. The leaves turn yellow followed by shedding of leaves and finally the entire plant wilts. In affected plants root development is poor. White mycelial growth often studded with small sclerotia was seen on basal part of the affected stem. Web blight symptoms appear on leaves as small circular, light grayish brown spots which later enlarge. The affected regions were surrounded by irregular water soaked area. On leaves also there is mycelial growth accomplished by sclerotial formation over the affected areas. Cobweb like symptoms also noticed on the leaves and hence the name. Different plant oils, oil cakes, indigenous materials like turmeric power-baking soda, rice husk ash is effective in controlling *R.solani* causing the disease. Bio-control agents like *Trichoderma harzianum*, *Pseudomonas fluorescens* can also be used to manage *R.solani*.

siva200619@gmail.com

Plant homeostasis through up-regulation of MiR171 under high temperature regimes as revealed by LNA mediated *in situ* hybridization and real time analysis in *Arabidopsis thaliana*

Barku M Mahale, B Fakrudin and P U Krishnaraj
University of Agricultural Sciences, India

The major class of endogenous small non-coding regulatory RNAs, microRNA (miRNA), are single stranded RNA molecules of about 20-24 nucleotides in length capable of modulating gene expression in plants. This class of small RNAs has been reported for their role in plant growth, development and stress regulatory pathways. In present study, miR171 was tested for its expression pattern under different heat shock regimes in leaf tissues of *Arabidopsis thaliana* using Locked Nucleic Acid (LNA) mediated *in situ* hybridization. There was an increased expression of miR171 with corresponding increase in temperature across 35°C, 40°C and 45°C compared to ambient temperature. With increased duration of exposure to 1hr, 2hr and 3hr at each temperature regime, there was an elevated accumulation of miR171. In the transverse section of leaf tissues, *in situ* hybridization signals were noticed all over including cuticle, lower and upper epidermis, spongy and palisade mesophyll tissues. Real-time transcript analysis revealed 1.16, 1.54 and 2.13 folds elevated levels of miR171 transcripts for 35, 40 and 45°C temperature regimes respectively at 3 hr of exposure. GRAS protein transcripts, such as SCL6-IV, SCL6-III, and SCL6-II are tightly regulated by miR171, and known to play important role in development of aerial plant organs, such as hypocotyl, inflorescence stems, shoot axial organs and radial pattern formation for both the root and shoot. Given the up-regulation of miR171 in leaf tissues experiencing heat shock regimes, possible role of miR171 in plant homeostatic response to heat shock seem to be obvious.

Biography

Barku M Mahale is Ph.D. scholar from Univ. of Agricultural Science, Dharwad. He worked on functional modulation of selected miRNAs in heat shock regimes in *Arabidopsis thaliana* and currently focusing on the development of transgenic pigeonpea for pod borer resistance. He published three short articles and given oral presentation in international conference on "Perspective of climate change and plant diversity inter-relation" at Manipal Life Science Center during 2011. He was JNU scholar for M.Sc. program.

barkumahale@gmail.com