

Effect of Cropping Systems and Nitrogen on Wilt Incidence, *Fusarium udum* Population and Its Antagonistic Fungi in Pigeonpea Rhizosphere

V. BHARATHI AND K. CHANDRASEKHAR RAO

International Journal of Plant Protection, Vol. 2 No. 1 : 8-11 (April to September, 2009)

SUMMARY

Experiment was conducted in the wilt sick field to find out the comparative performance of organic, inorganic amendments, intercropping systems and their integration for the management of wilt in pigeonpea. Soil application of amendments through 20 kg N ha⁻¹ FYM + 20 kg N ha⁻¹ through KNO₃ (64%) caused maximum per cent inhibition followed by 40 kg N ha⁻¹ as KNO₃ (52%). Maximum reduction of pathogen populations (32%) and maximum antagonistic fungi (80%) was observed in the rhizosphere soil of plots amended with 40 kg N ha⁻¹ through KNO₃ over control. Integration of amendments with 40 kg N ha⁻¹ through KNO₃ with all cropping systems resulted in maximum reduction of fungal population and wilt incidence. Intercropping of sorghum + pigeonpea and soybean + sunflower found to reduce wilt incidence and *Fusarium* population. Of soil mycoflora enumerated from the rhizosphere, maximum levels of inhibition (71-83%) found with *Trichoderma viride* *Trichoderma harzianum* and *Aspergillus nidulans* spp. against *F. udum*. From the study, organic amendments, inorganic amendments and intercropping system proved best for the management of wilt.

See end of the article for authors' affiliations

Correspondence to :
V. BHARATHI
Farmers Call Centre,
Begumpet, Acharya
N.G. Ranga Agricultural
University,
Rajendranagar,
HYDERABAD (A.P.)
INDIA

Key words :

Antagonistic
fungi, *Fusarium*
udum,
Intercropping
systems,
Pigeonpea wilt.

Vascular wilt (*Fusarium udum* Butler) is one the most important diseases of pigeonpea [*Cajanus cajan* (L.) Millsp.] causing loss upto 67% at maturity and complete loss in case of infection at prepod stage (Kannaiyan and Nene, 1981). To date, *Fusarium* wilt has been reported from 15 countries, but it is relatively more important in India and eastern Africa. Chemical control of the disease is difficult impractical and uneconomical. The wilt pathogen is reported to be present in infected plant stubbles in soil up to 3-4 years even in the absence of host crop ((Reddy *et al.*, 1992). It is now established that sorghum as a mixed or intercrop is an effective management approach for reducing wilt in pigeonpea (Natarajan *et al.*, 1985). Intercropping of pigeonpea with soybean, groundnut, sunflower and sorghum is a common practice in most of the areas in Andhra Pradesh. Cultural practices in addition to cropping pattern like organic amendments in pigeonpea (Raghuchander *et al.*, 1992) and inorganic fertilizers in muskmelon (Chattopadhyay and Sen, 1996) are reported to reduce wilt incidence as well as pathogen population. Enhancement of antagonistic fungal population by organic and inorganic fertilizers had been earlier reported. In view of the above, the present study was undertaken to assess the effect of intercropping systems with non host

crops and cultural practices on wilt incidence, population of pathogen and antagonistic fungi in pigeonpea rhizosphere.

MATERIALS AND METHODS

The experiment was laid out in two consecutive seasons of 1996-97 and 1997-98 at ICRISAT, Patancheru, AP. Field experiment was carried out in split design with three replication in a wilt sick plot with a *Fusarium* inoculum load of 46x10³ cfu/g soil with a wilt susceptible cultivar, ICP 2376. Sub plots consisting of cropping systems *viz.*, sole cropping of pigeonpea, pigeonpea + sorghum, pigeon pea + soybean intercropping system and sole crop of soybean. Six main treatments consisted of different nitrogen sources and levels along with recommended dose of fertilizer *i.e.* inorganic fertilizer, organic fertilizer and combination of inorganic + organic fertilizer at lower dose as 20 kg N ha⁻¹ through FYM, 20 kg N ha⁻¹ through KNO₃, 40 kg N ha⁻¹ through FYM and 40 kg N ha⁻¹ through KNO₃ and 20 kg N as FYM + 20 kg N kg as KNO₃. The recommended dose of fertilizer without any addition of amendment constituted control. The recommended NPK dose for intercropping was calculated based on the proportion of plant population of the component crops. Sowing was done in *kharif* in both the years of experimentation in a plot of 8x6 m² with a

Accepted :
October, 2008