RESEARCH ARTICLE

REACTION OF SORGHUM GENOTYPES FOR SHOOT AND PANICLE PESTS IN TIMELY AND LATE SOWN CROP

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Abstract: A field experiment entitled "Reaction of Sorghum Genotypes against Shoot and Panicle Pests in Timely and Late sown Crop was carried out in a Randomized Block Design during *Kharif* season, 2015-16 at College of Agriculture, Indore (M.P.). Based on the objectives the observations were recorded to study the combating ability, including impact of two dates of sowing on the insect pests viz, shoot fly (*Atherigona soccata* Rondani), stem borer (*Chilo partellus* Swinhoe), ear head worm (*Cryptoblabes gnidiella* Mab.), ear head bug (*Calocoris angustatus* Leth.) of sorghum.Among 43 varietal genotypes less incidence of shoot fly (dead hearts per cent) was recorded in timely sown crop as compared to late sown crop. The stem borer infestation as well as ear head pests recorded numerically higher in timely sown crop. The lowest shoot fly attack was recorded in both the resistant checks IS 18551 and IS 2205 in timely and late sown condition. Eleven entries were found resistant in timely sown crop while, nine entries were susceptible in late sowncrop.The lowest stem borer leaf injury (%) was observed in SPV 2294 (2.33%) and maximum in DJ 6514 (14.00%). However at 45 DAE, the lowest damage was recorded in resistant checks. The lowest dead heart per cent was recorded in susceptible check Swarna (45.33%). Whereas under late sown condition minimum dead heart per cent was recorded in SPV 2367 (3.78%) on with eight another entries. The stem tunneling due to stem borer per cent under timely sowing ranged between 3.62% and 19.83%, finally all the entries exhibited resistance against the insect. Whereas, under late sown condition range of stem tunneling ranged between1.19% and 9.49%. Under timely sown crop condition bug and worm count ranged between 3.33 and 12.60**,** 3.03 and 15.33 respectively**.** However, under late sown condition the population of bug and worm ranged from 1.67 to 6.67 and 2.33 to 7.67.Under both timely & late sown crop, the maximum grain yield (Kg/ha) was 1675.73 & 600.72 in genotype SPV 2368 respectively

Keywords: Sorghum genotypes, Reaction of sorghum pest, Timely, Late sown crop

INTRODUCTION

Sorghum [Sorghum *bicolor* (L.) Moench] is an important staple food crop of the world and 5th most important cereal crop after wheat, rice, maize and barley. It is grown in an area of 43.11 million hectares with 64.87 million metric tonnes production and productivity of 1.50 million metric tons in the world (USDA 2014-15). Major producers are the USA, Mexico, Nigeria, India, and Argentina with 10.99, 6.27, 6.70, 5.45 and 3.50 million tones production. In India sorghum is the third important cereal after rice and wheat, grown on average 5.50 million ha^{-1} (first rank in world) with production of 5.45 million tons (forth rank in the world) and productivity 990 kg ha^{-1}(35th rank in the world) (USDA 2014-15).In Madhya Pradesh, sorghum crop is grown mainly in *kharif* season and covers an area of 454 hectares and production 5.89 lakh tones with productivity of 1297 kg ha^{-1} respectively (NFSM 2014-15) and cultivated mainly in Malwa, Jhabua, Nimar, Gird and Satpuraplateau.Borad and Mittal (1983) have reported that nearly 32.2% of the grain yield was lost due to insect damage. On all India basis shoot fly has been reported to cause an average loss of 5 % (Jotwani, 1983). Yield loss of 55 to 83 % has been recorded due to stem borer infestation in northern lndia (Jotwani *et al*. 1971).

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MATERIAL AND METHODS

Field experiment was conducted at the during kharif season, 2015-16 at the Research Field, College of Agriculture, indore (M.P.). The experiment was carried out in Randomized Block Design (RBD) with three replications. In this experiment 43 newly developed bred sorghum genotypes (38 genotypes and 5 checks) were evaluated along with three susceptible checks (DJ 6514, ICSV 745 & Swarna) and two resistant checks (IS 2205 & IS 18551) and one local checks (JJ 1041). Seeds were planted in 2m. two row length (each entry) and replication 1.0 m. apart.

RESULTS AND DISCUSSION

Thirty eight genotypes along with five checks IS 2205 (RC), IS 18551 (RC), DJ 6514 (SC), ICSV 745 (SC), SWARNA (SC), JJ 1041(LC) were evaluated for resistance against shoot fly (*Atherigona soccata*, Rondani), stem borer (*Chilo partellus*, Swinhoe), ear head bug (*Calocoris angustatus* Leth.) and ear head worm of sorghum (*Cryptoblabus gnidiella* Mab.). The incidence of shoot fly on sorghum was recorded on shoots at crop age of 21 and 28 days after emergence for the per cent dead heart. It is revealed from data that less dead heart per cent caused by shoot fly recorded in timely sown crop (23 June,

2015) as compared to late sown crop (15 July, 2015). After 21 days under timely sown crop ,shoot fly lowest dead heart percent recorded in both resistant entry IS 18551(7.67%) and IS 2205(8.00%) and maximum dead heart was observed in susceptible check Swarna (53.33%).under late sown crop ,shoot fly lowest dead heard percent was noticed in resistant entry IS 2205 (16.67%), ICSV 745 (18.33%) and SPV (26.00%), However, maximum dead heart was recorded in susceptible check Swarna (63.33%) and DJ 6514 (51.67%).After 28 days under timely sown crop, shoot fly lowest dead heart per cent was observed in both the resistant checks IS 2205 (13.33%) and IS 18551 (17.00%), Whereas, maximum shoot fly incidence was recorded in susceptible check Swarna (56.67%).under late sown crop, The least infestation was recorded in resistant check IS 18551 (29.33%). maximum shoot fly incidence was recorded in susceptible check Swarna (81.67%) Shekharappa and Ramegowda (2005),Badgujar *et al.* (2006), Shekharappa and Ramegowda (2007), Balikai and Biradar (2007),Subbarayudu *et al.*,(2011b) evaluated 35 entries Subbarayudu *et al.* (2011a) evaluated 27 genotypes of sorghum for resistance to shoot fly. Seven genotypes viz., ICSV 745, IS 2312 and IS 2205 were found resistant while 14 genotypes were moderately resistant.Parmar (2012) , Kumar *et al.* (2015) concluded that shoot fly was active throughout the *Kharif* season, therefore timely sowing will reduce the incidence of shoot fly. But the crop was less prone to attack of the shoot fly when the crop was sown during the early June.Stem borer leaf injury percent under timely sown crop at 30 DAE the minimum leaf injury per cent was observed in SPV 2294 (2.33%), IS 18551 (2.67%) and SPV 2298 (2.67%), Whereas, the maximum leaf injury was observed in DJ 6514 (14.00%) which was at par with ICSV 745 (12.00%), and Swarna (10.33%) . However, under late sowing conditions, leaf injury caused by stem borer was not noticed in both resistant checks IS 18551 and IS 2205 and other 23 entries. In rest of the entries the minimum leaf injury was reported in SPV 2363 and SPV 2372 (2.33%).which extended maximum in DJ 6514 (6.89%). The above findings are in accordance with Jhansi (2005), Prasad *et al.* (2011) evaluated 47 sweet sorghum genotypes for resistance to stem borer and found 11 genotypes resistant to stem borer. Parmar (2012) reported the leaf injury by stem borer as 0.0% in 52 genotypes (timely sown crop) and 60 genotypes (late sown crop). The infestation at 45 DAE under timely sown conditions and the lowest damage was recorded in both resistant check IS 2205 (12.67%) and IS 18551 (RC) (12.83%), However, maximum dead heart per cent was recorded with in susceptible check Swarna (45.33%). Whereas, under late sown condition minimum dead heart per cent was recorded in SPV 2301 and CSV 27 (3.33%), However, the maximum infestation received in susceptible check DJ 6514 (24.67%). Prasad *et al.* (2011) evaluated 47 sweet sorghum genotypes for resistance to stem borer and found 11 genotypes resistant to stem borer. Vyas *et al.* (2014) reported that, CSV 15, CSV 17, recorded minimum stem borer dead hearts. The stem tunnelling per cent under timely sown crop in the least dead heart per cent was noticed in resistant check IS 2205 (3.62%) and IS 18551 (3.74%),and test entries .whereas, the maximum stem tunnelling was recorded in SPV 2362 (19.83%) ,SPV 2363 (17.99%) and SPV 2357 (19.06%). Whereas, under late sown condition range of stem tunnelling was recorded between1.19% to 9.49%. Among all entries SPV 2293 (1.19%) was less affected by stem borer stem tunnelling, which was at par with SPV 2304 (1.26%), JJ 1041 (1.26%), SPV 2296 (1.60%). Sarailoo (1986) recorded 0.00% to 0.58% and 1.12% to 7.11% stem tunnelling in early and late sown crop, respectively. Gour (1995) recorded 0.51% to 12.71% stem tunnelling. Under timely sown crop condition,the minimum number of ear head bug was recorded in resistance check IS 2205 (3.33) Whereas, susceptible check DJ 6514 (12.60) recorded maximum number of bug which was at par with SPV 2293 (10.33) under late sown condition the minimum insect count was observed in both the resistant checks IS 18551 (1.67) and IS 2205 (2.00), maximum number of bug has been obtained in SPV 2293 (6.67). The population of ear head worm under timely sown crop, minimum number of ear head bug was recorded in resistance check IS 18551 (3.00) However, highest worm count was noticed in susceptible entry SPV 2359 (15.33) under late sown conditions the minimum worm number was recorded in resistant check IS 2205 (RC) (2.33), SPV 235 (2.33), SPV 2355 (2.33), Patel (2011) recorded the lowest number of ear head bug in resistant checks IS 2205, IS 2312 and IS18551.Raipuria (2014) reported minimum ear head worm incident in both resistance entry (IS 18551 and IS 2205), while maximum incidence was reported in all susceptible entries (DJ 6514, Swarna and ICSV 745).

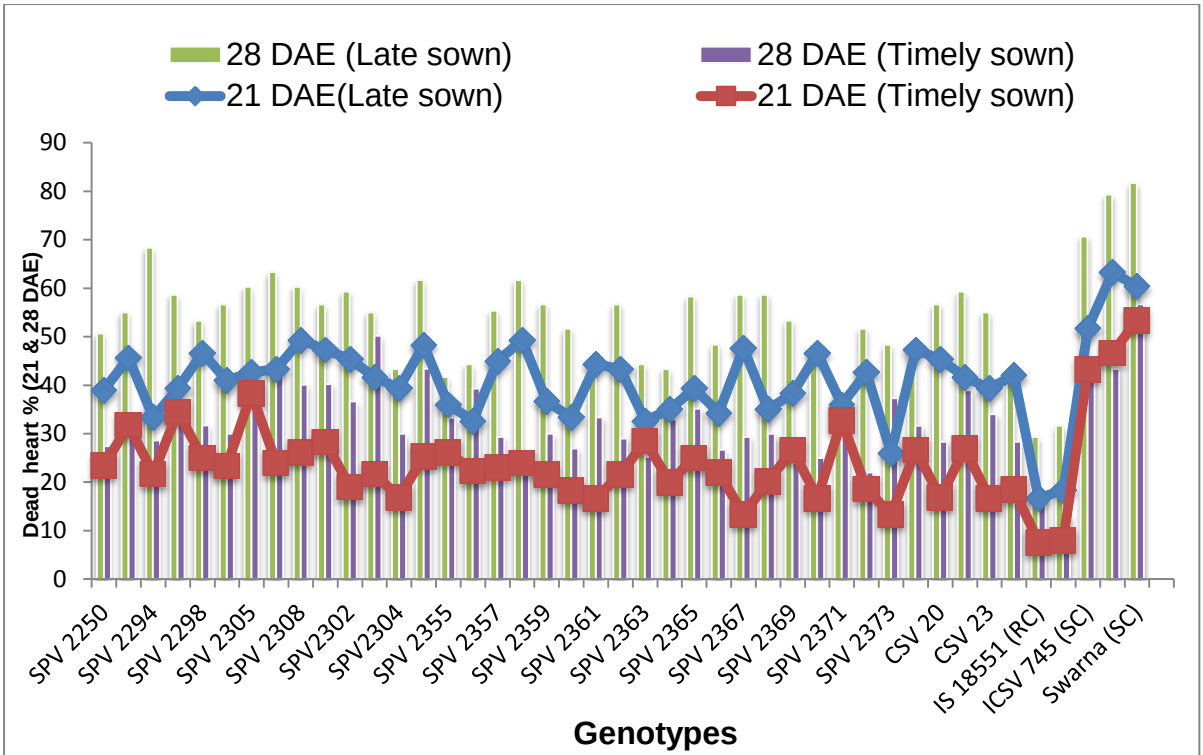

Fig 4.1 Reaction of sorghum genotypes against shoot fly at 21 &28 DAE

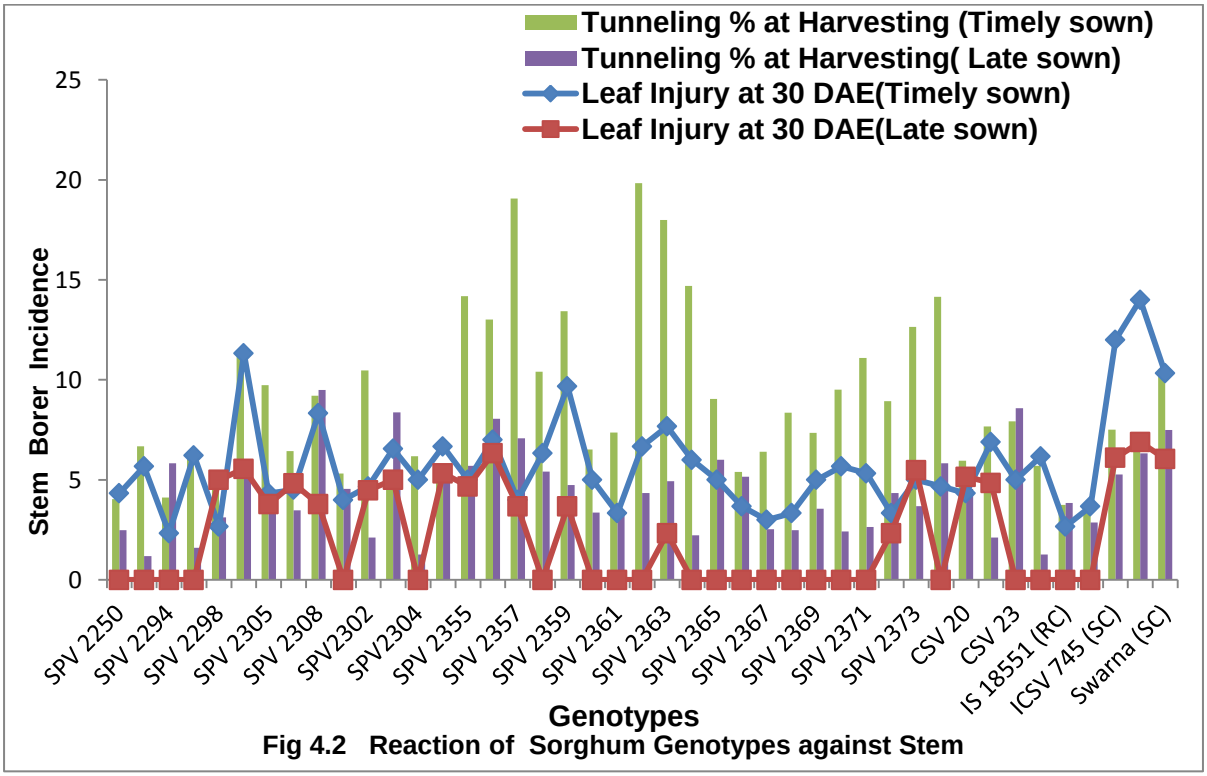

Fig 4.2 Reaction of Sorghum Genotypes against Stem

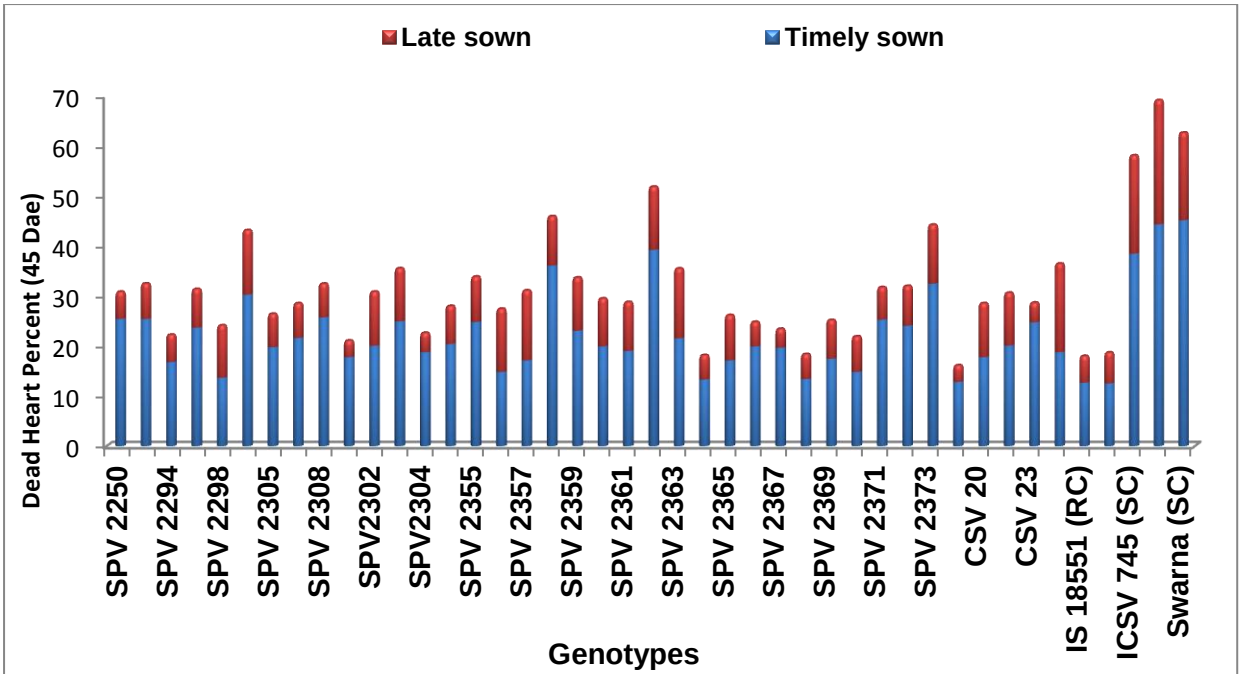

Fig 4.2.1 Reaction of Sorghum Genotypes against Stem Borer at 45 DAE

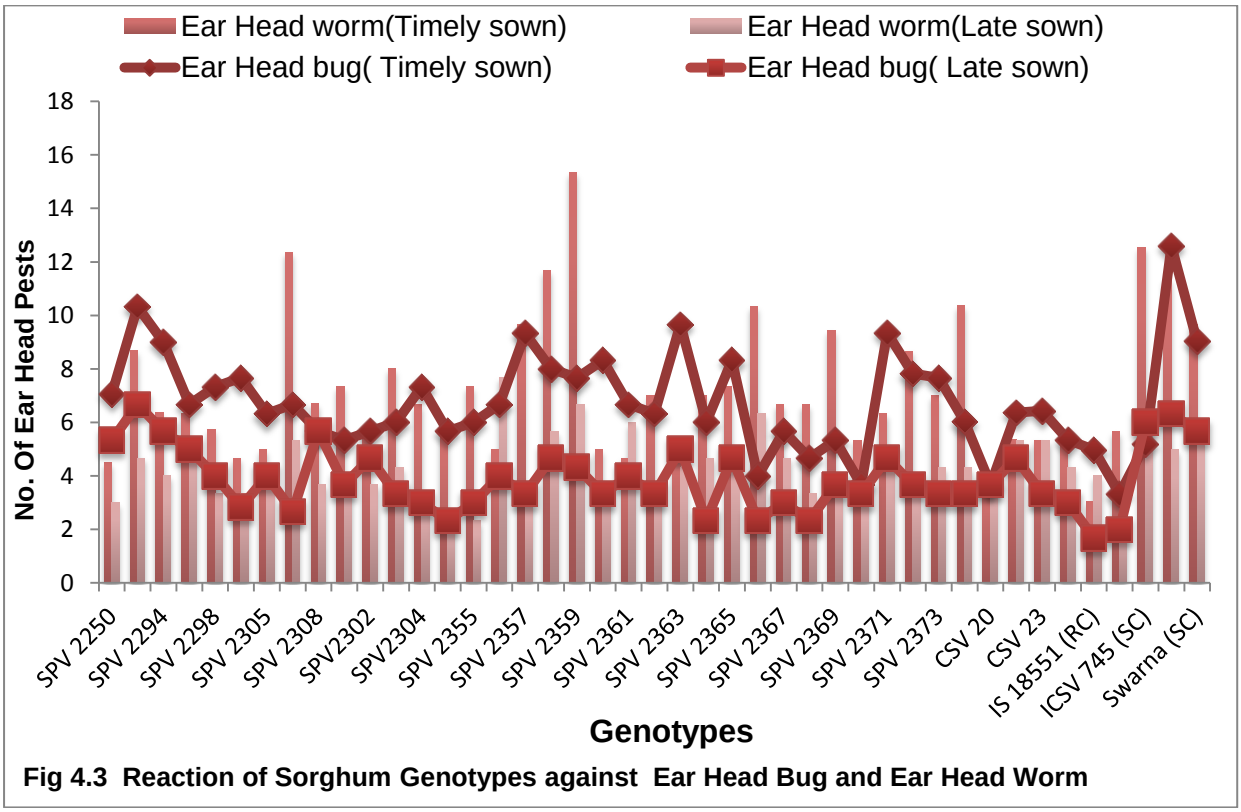

Fig 4.3 Reaction of Sorghum Genotypes against Ear Head Bug and Ear Head Worm

CONCLUSION

Minimum pest incidence was reported in both resistance entry (IS 18551 and IS 2205), while maximum incidence reported in all susceptible entries (DJ 6514, Swarna and ICSV 745). Minimum shoot fly dead hearts was recorded in IS 2205 and ICSV 745, minimum stem borer incidence (leaf injury, dead hearts and stem tunneling) were recorded in SPV 2294, SPV 2301 (2) and CSV 27, while minimum ear head pests (bug and worm) was counted in IS 2205 and SPV 2370 (2).

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