SCREENING OF DIFFERENT BRINJAL GENOTYPES / CULTIVARS TO MITES, *Tetranychus urticae* KOCH

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ABSTRACT

An experiment was conducted to study the susceptibility of different brinjal genotypes/cultivars against mite, Tetranychus urticae Koch under field condition at College Agronomy Farm, Navsari Agricultural University, Navsari during kharif-rabi 2014-15. Out of 12 genotypes/cultivars screened, genotype JDNB 120 recorded significant minimum mite population in comparison to JDNB 119, JBL 08-07, JBL 08-08, JB 12-06, AB 12-10, AB 08-14 and AB 13-14, while it was at par with NSR 1, JBGR 06-08, AB 07-02 and variety Jambli (Pant bahar). Genotypes AB 12-10, AB 08-14 and AB 13-14 found most susceptible, which recorded significantly higher mite population and were at par with each other. Genotype JDNB 120 yielded significantly higher fruits (254.8 q/ha) than JDNB 119, JBL 08-07, JBL 08-08, JB 12-06, AB 12-10, AB 08-14 and AB 13-14, but was at par with NSR 1, JBGR 06-08, AB 07-02 and variety Jambli (Pant bahar). Genotype AB 13-14 registered significantly lower fruit yield and was at par with AB 08-14, AB 12-10 and JB 12-06.

Key words: Brinjal, fruit yield, mite, screening, Tetranychus urticae

INTRODUCTION

Brinjal (*Solanum melongena* Linnaeus) also known as eggplant is considered as a “King of vegetables”, originated from India, where a wide range of wild types and land races occur (Thompson and Kelly, 1957). It is grown throughout the tropical, sub-tropical and warm temperate areas of the world. In world, the production of brinjal is about 4.9 crore Metric Tonnes (MT). India is the second largest producer of brinjal after China (Anonymous, 2014). In India, the crop is cultivated in about 7.2 lakh hectares with a production of 134 lakh MT. In India, it is cultivated mainly in West Bengal, Orissa, Bihar and Gujarat. In Gujarat, the total area under brinjal cultivation is 0.72 lakh hectares with annual production of 13.4 lakh MT (Anonymous, 2014). Brinjal crop suffers severely due to the attack of various insect pests which reduces its yield and quality of fruits. Patel *et al.* (1970) recorded 16 pest species attacking brinjal crop in Gujarat. Of which, shoot and fruit borer, *Leucinodes orbonalis* Guenee; jassid, *Amrasca biguttula biguttula* (Ishida); whitefly, *Bemisia tabaci* Gennadius; aphid, *Aphis gossypii* Glover and mites, *Tetranychus urticae* Koch are the major and important insect pests.

Of these, red spider mite, *T. urticae* poses serious threat as a major pest next to shoot and fruit borer to the cultivation of brinjal (Basu and Pramanik, 1968). The reduction in yield due to mite infestation was up to 14 per cent at Bangalore and 31 per cent at Varanasi (Anonymous, 1996). Patil and Nandihali (2008) estimated the yield losses in the range of 12.18 to 32.21 per cent due to infestation of mite at Dharwad. Palanisamy and Chelliah (1987) noticed the reduction of 28.00 per cent fruit yield due to spider mite infestation in brinjal. On an average 16.16 per cent yield loss in brinjal due to *T. urticae* was noticed in India (Anonymous, 2007). Both nymphs and adults of mites suck the sap usually from the lower surface of leaves producing small white specks, which gradually dry and drop off. Infested plant become yellowish, wilted and droop rapidly particularly during dry periods. The dense web produced by spider mite often covers the plant where dust particles adhere in windy weather which in turn affects the physiological activity of the plant, making it stunted. The entire plant becomes yellowish giving poor unhealthy look. Infested leaves wither and eventually fall off. In severe infestation, it webs profusely and may form a thick sheath of webbing that covers the entire plant (Butani and Mittal, 1992). Resistant varieties provides insect control without additional cost, acts as preventive measure against build up of insect with other method of pest control and are free from environmental pollution problems (Atwal and Dhaliwal, 1999). Hence, the present investigation was carried out.

MATERIALS AND METHODS

Field experiment was conducted at College Agronomy Farm, Navsari Agricultural University, Bharuch during *kharif-rabi* season of 2014-15 to evaluate the susceptibility of different genotypes/cultivars against mite. Brinjal seedlings of respective 12 genotypes/ cultivars were transplanted on 15th July in a plot size of 20 m x 10 m in spacing of 90 cm x 60 cm and raised successfully by adopting recommended suitable agronomical practices. The susceptibility of genotypes/cultivars to *T. urticae* was evaluated on the basis of number of mites per leaf and brinjal fruit yield. For recording observations of mites, five plants were randomly selected and tagged in each net plot area. The observations on mite population was recorded from 2 x 2 cm^2 area of three leaves (upper, middle and lower) of same selected plants. The observations were recorded at weekly interval starting from third week after transplanting till to the harvest of the crop. The whole experimental plot was kept free from any acaricides.

The periodical data on number of mites/4 cm^2 leaf area recorded at weekly interval were subjected to analysis of variance (ANOVA) after transforming them to square root. However, the data on fruit yield were analyzed without any transformation. The data on mites were analyzed periodically as well as pooled over periods.

RESULTS AND DISCUSSION

Mite population

The periodical data (Table 1) on mite population in different genotypes/cultivars were significant. The chronological order of genotypes/cultivars for their susceptibility to mite in data pooled over periods (Table 1, Figure 1) (with number of mite/4 cm^2 leaf given in brackets after each genotypes/cultivars) was JDNB 120 (9.62) < NSR 1 (11.49) < JBGR 06-08 (13.62) < AB 07-02 (13.79) < Jambli

(Pant bahar) (14.07) < JDNB 119 (15.01) < JBL 08-07 (16.44) < JBL 08-08 (19.25) < JB 12-06 (21.21) < AB 12-10 (33.98) < AB 08-14 (34.38) < AB 13-14 (37.04). There was a significant difference among the genotypes/cultivars. Genotypes JDNB 120 recorded significantly minimum mite population in comparison to JDNB 119, JBL 08-07, JBL 08-08, JB 12-06, AB 12-10, AB 08-14 and AB 13-14, while it was at par with NSR 1, JBGR 06-08, AB 07-02 and variety Jambli (Pant bahar). Genotype JBL 08-07 was at par with JBL 08-08 and JB 12-06 on one hand and with JBGR 06-08, AB 07-02, variety Jambli (Pant bahar) and JDNB 119 on other hand of chronological order. Genotypes AB 12-10, AB 08-14 and AB 13-14 found most susceptible which recorded significantly higher mite population and were at par with each other. Moreover, the genotypes JB 12-06, AB 12-10, AB 08-14 and AB 13-14 were more susceptible than susceptible check variety Jambli (Pant bahar), as these genotypes recorded significantly higher mite population as compared to Jambli (Pant bahar). In present investigation, JDNB 120, NSR 1, JBGR 06-08, as well as AB 07-02 found less susceptible, Jambli (Pant bahar), JDNB-119, JBL-08-07 as well JBL-08-08 were moderately susceptible, and JB 12-06, AB 12-10, AB 08-14 as well as AB 13-14 found more susceptible.

The relative susceptibility of brinjal varieties to mites were studied by various research workers at different places [Sharma and Kushwaha (1983), Mishra and Somchoudhury (1989), Mishra *et al.* (1990), Chundawat *et al.* (2006) and Kumar *et al*. (2013)]. In present investigation, the local genotypes/cultivars were screened for their susceptibility to mites which were not evaluated elsewhere by any research workers hence, the results of present investigations could not be compared.

Brinjal fruit yield

The data on Brinjal fruit yield are presented in Table 2 and was depicted in Figure 2. The order of genotypes/cultivars with yield in quintal per hectare (q/ha) was JDNB 120 (254.8) > NSR 1 (244.4) > JBGR 06-08 (234.0) > AB 07-02 (223.6) > Jambli (Pant bahar) (213.2) > JDNB - 119 (202.8) > JBL 08-07 (192.4) > JBL 08-08 (182.0) > JB 12-06 (171.6) > AB 12-10 (161.2) > AB 08-14 (150.8) > AB 13-14 (140.4). There was significant difference among the genotypes/cultivars for fruit yield. Genotype JDNB 120 yielded significantly higher fruits than JDNB 119, JBL 08-07, JBL 08-08, JB 12-06, AB 12-10, AB 08-14 and AB 13-14, but was at par with NSR 1, JBGR 06-08, AB 07-02 and variety Jambli (Pant bahar). Genotype AB 13-14 registered significantly lower fruit yield and was at par with AB 08-14, AB 12-10 and JB 12-06. Overall, JDNB 120, NSR 1, JBGR 06-08 and AB 07-02 had lower infestation of mite and yielded higher fruits considered as less susceptible, Jambli (Pant bahar), JDNB 119, JBL-08-07 and JBL-08-08 considered as moderately susceptible, whereas JB 12-06, AB 12-10, AB 08-14 as well as AB 13-14 had more infestation of pests with lower fruit yield were considered more susceptible.

CONCLUSION

Out of 12 genotypes/cultivars, genotype JDNB 120 recorded significant minimum mite population in comparison to JDNB 119, JBL 08-07, JBL 08-08, JB 12-06, AB 12-10, AB 08-14 and AB 13-14. Genotypes AB 12-10, AB 08-14 and AB 13-14 found most susceptible, which recorded significantly higher mite

population and were at par with each other. Genotype JDNB120 yielded significantly higher fruits (254.8 q/ha) than JDNB 119, JBL 08-07, JBL 08-08, JB 12-06, AB 12-10, AB 08-14 and AB 13-14.

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Table 1: Mite population in different genotypes/cultivars of brinjal

Genotypes/Cultivars	Number of Mite/4 cm^2 Leaf Area at Indicated Weeks After Transplanting						
	III	IV	V	VI	VII	VIII	IX
AB 07-2	2.45 (5.56)	2.14 (4.13)	2.70 (6.86)	3.14 (9.41)	3.08 (9.05)	3.98 (15.51)	4.55 (20.34)
AB 08-14	3.79 (13.87)	3.28 (10.3)	4.19 (17.09)	4.89 (23.46)	4.80 (22.55)	6.25 (38.66)	7.15 (50.71)
AB 12-10	3.77 (13.71)	3.27 (10.18)	4.17 (16.89)	4.86 (23.19)	4.77 (22.29)	6.22 (38.21)	7.11 (50.12)
AB 13-14	3.93 (14.94)	3.40 (11.09)	4.35 (18.42)	5.07 (25.28)	4.98 (24.30)	6.49 (41.66)	7.42 (54.64)
JBGR 06-08	2.44 (5.49)	2.13 (4.08)	2.69 (6.77)	3.12 (9.3)	3.06 (8.94)	3.96 (15.32)	4.52 (20.09)
JBL 08-07	2.66 (6.63)	2.32 (4.93)	2.94 (8.17)	3.41 (11.22)	3.35 (10.79)	4.35 (18.49)	4.96 (24.26)
JBL 08-08	2.87 (7.76)	2.50 (5.76)	3.17 (9.57)	3.69 (13.14)	3.62 (12.63)	4.70 (21.65)	5.36 (28.39)
JB 12-06	3.00 (8.56)	2.61 (6.35)	3.32 (10.55)	3.86 (14.48)	3.79 (13.92)	4.93 (23.86)	5.63 (31.3)
JDNB 119	2.55 (6.06)	2.23 (4.5)	2.81 (7.46)	3.27 (10.25)	3.21 (9.85)	4.16 (16.88)	4.74 (22.14)
JDNB 120	2.08 (3.88)	1.83 (2.88)	2.28 (4.78)	2.64 (6.57)	2.59 (6.31)	3.34 (10.82)	3.80 (14.2)
NSR 1	2.26 (4.64)	1.98 (3.44)	2.48 (5.71)	2.87 (7.84)	2.82 (7.54)	3.64 (12.92)	4.15 (16.95)
Jambli (Pant bahar) (C)	2.48 (5.68)	2.16 (4.22)	2.73 (7.00)	3.17 (9.61)	3.11 (9.23)	4.02 (15.83)	4.59 (20.76)
S. Em. ± N	0.14	0.12	0.15	0.18	0.18	0.24	0.27
N x P	-	-	-	-	-	-	-
C.D. at 5% N	0.40	0.34	0.45	0.53	0.52	0.69	0.79
N x P	-	-	-	-	-	-	-
C. V (%)	8.32	8.12	8.44	8.58	8.56	8.73	8.79

Table 1: Contd….

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Genotypes /Cultivars	Number of Mite/4 cm^2 Leaf Area at Indicated Weeks After Transplanting							
	X	XI	XII	XIII	XIV	XV	XVI	Pooled Over Periods
AB 07-2	4.78 (22.59)	5.36 (28.49)	5.04 (25.12)	4.64 (21.21)	3.32 (10.62)	2.95 (8.29)	2.51 (5.87)	3.76 (13.79)^{abc}
AB 08-14	7.53 (56.32)	8.45 (71.03)	7.94 (62.62)	7.30 (52.88)	5.19 (26.48)	4.60 (20.66)	3.89 (14.64)	5.90 (34.38)^{f}
AB 12-10	7.49 (55.66)	8.40 (70.20)	7.89 (61.89)	7.26 (52.27)	5.16 (26.17)	4.57 (20.42)	3.87 (14.47)	5.87 (33.98)^{f}
AB 13-14	7.82 (60.68)	8.77 (76.53)	8.24 (67.47)	7.58 (56.98)	5.38 (28.53)	4.77 (22.26)	4.03 (15.77)	6.12 (37.04)^{f}
JBGR 06-08	4.76 (22.31)	5.33 (28.14)	5.01 (24.81)	4.61 (20.95)	3.30 (10.49)	2.94 (8.19)	2.50 (5.80)	3.74 (13.62)^{abc}
JBL 08-07	5.22 (26.94)	5.85 (33.97)	5.50 (29.95)	5.06 (25.30)	3.62 (12.66)	3.21 (9.88)	2.73 (7.00)	4.10 (16.44)^{cde}
JBL 08-08	5.65 (31.53)	6.33 (39.76)	5.95 (35.06)	5.48 (29.61)	3.91 (14.82)	3.47 (11.57)	2.94 (8.20)	4.43 (19.25)^{de}
JB 12-06	5.93 (34.75)	6.65 (43.83)	6.25 (38.64)	5.75 (32.64)	4.10 (16.34)	3.63 (12.75)	3.08 (9.03)	4.65 (21.21)^{e}
JDNB 119	4.99 (24.59)	5.60 (31.01)	5.26 (27.34)	4.84 (23.09)	3.46 (11.56)	3.08 (9.02)	2.62 (6.39)	3.93 (15.01)^{bcd}
JDNB 120	4.00 (15.76)	4.47 (19.88)	4.21 (17.53)	3.88 (14.8)	2.79 (7.41)	2.49 (5.78)	2.13 (4.1)	3.15 (9.62)^{a}
NSR 1	4.37 (18.82)	4.90 (23.74)	4.60 (20.93)	4.24 (17.68)	3.04 (8.85)	2.71 (6.91)	2.31 (4.89)	3.44 (11.49)^{ab}
Jambli (Pant bahar (C)	4.83 (23.06)	5.42 (29.08)	5.09 (25.64)	4.69 (21.65)	3.35 (10.84)	2.98 (8.46)	2.54 (5.99)	3.80 (14.07)^{abcd}
S. Em. ± N	0.29	0.32	0.30	0.28	0.19	0.17	0.14	0.22
N x P	-	-	-	-	-	-	-	0.32
C.D. at 5% N	0.84	0.94	0.88	0.81	0.57	0.50	0.41	0.65
N x P	-	-	-	-	-	-	-	NS
C. V (%)	8.81	8.84	8.82	8.79	8.62	8.53	8.36	8.70

Note: 1. Treatment means with letter(s) in common are not significant at 5 % level of significance in respective column
2.Figures in parentheses are retransformed values; while, those outside are $\sqrt{X+0.5}$ **** transformed values***

Table 2: Yielding ability of different genotypes/cultivars of brinjal

Genotypes/Cultivars	Fruit Yield (q/ha)
AB 07-2	223.6^{abcd}
AB 08-14	150.8hi
AB 12-10	161.2ghi
AB 13-14	140.4i
JBGR 06-08	234.0abc
JBL 08-07	192.4defg
JBL 08-08	182.0efgs
JB 12-06	171.6fghi
JDNB 119	202.8cde
JDNB 120	254.8a
NSR 1	244.4ab
Jambli (Pant bahar) (C)	213.2bcde
S. Em ±	12.94
C. D. at 5%	37.94
C. V. (%)	11.34

Note: Treatment means with letter(s) in common are not significant at 5 % level of significance.

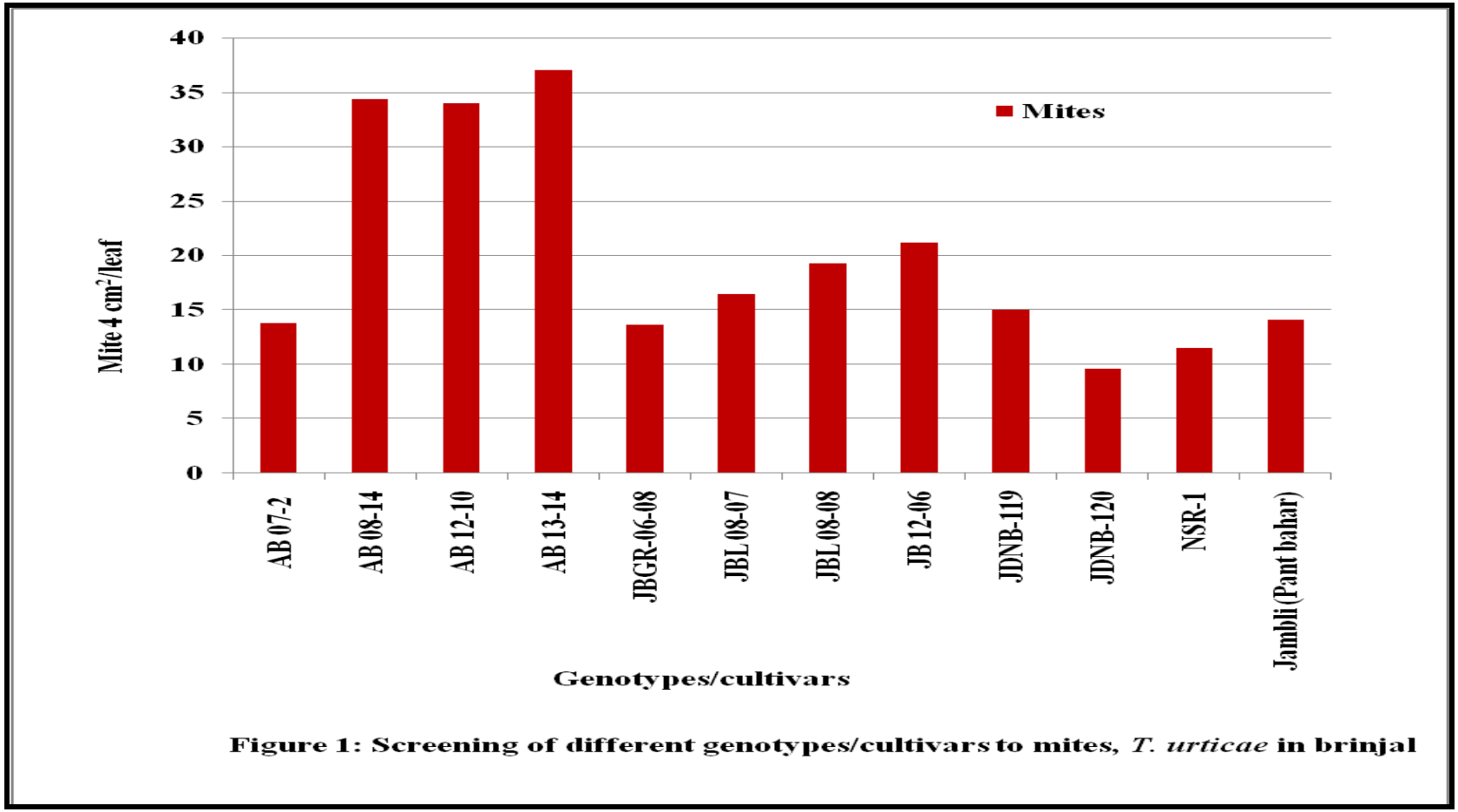

Figure 1: Screening of different genotypes/cultivars to mites, *T. urticae* in brinjal

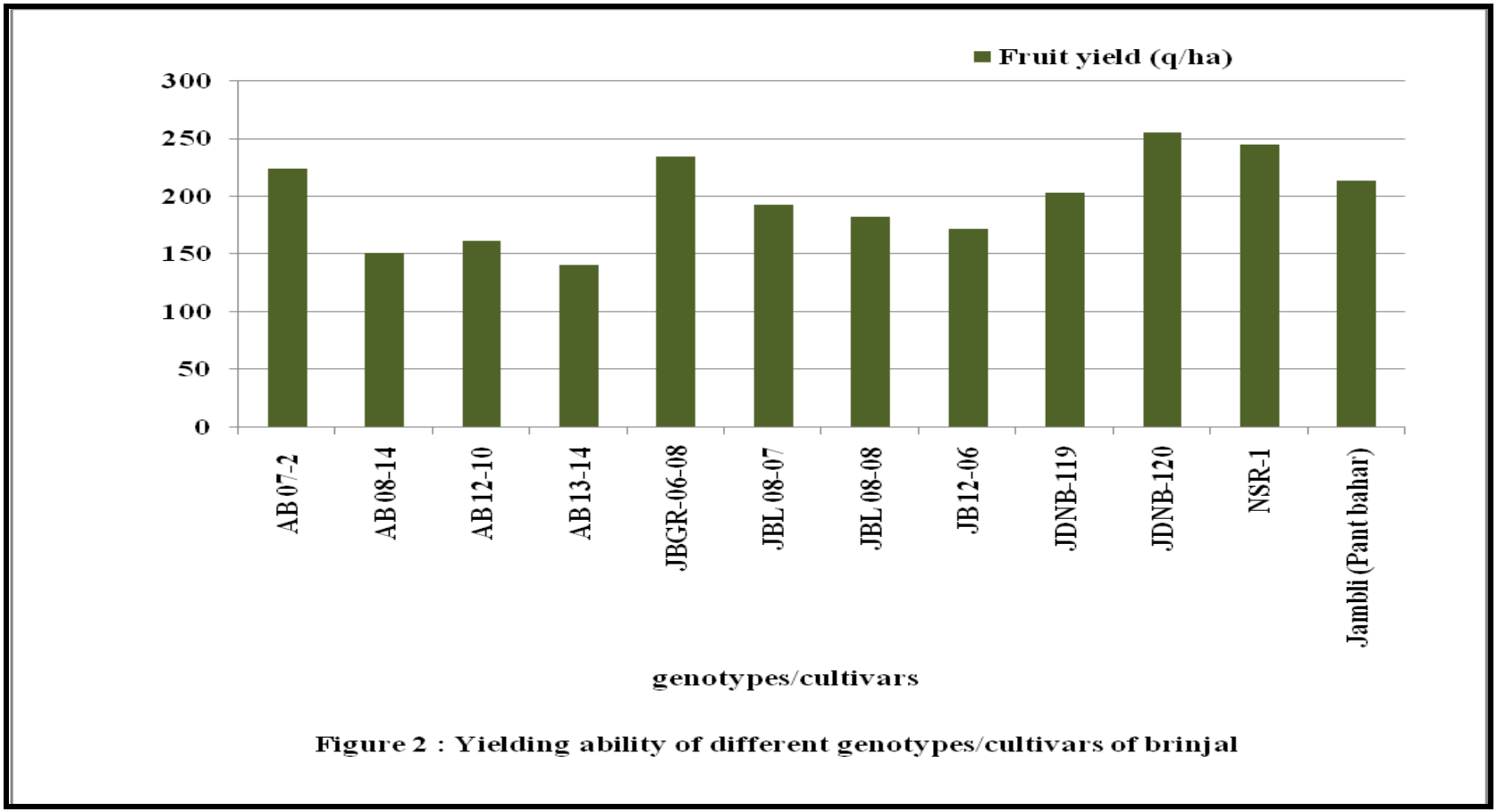

Figure 2 : Yielding ability of different genotypes/cultivars of brinjal

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