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Effect of different varieties maturity stages and spray schedules based management of *Helicoverpa armigera* (Hubner) on pigeonpea

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Abstract
To study crop phenology based management of pod borer complex of pigeonpea in four different cultivars in split plot design, two consecutive sprays of emamectin benzoate 5% SG @ 4.4 gm/10 liter water followed by flubendiamide 39.3% SC @ 3.9 ml/10 liter water at 15 days interval were taken at various crop growth stages. Four cultivars of pigeon pea *viz.*, BDN-711 (early), BSMR-736 (late), BSMR-853 (late) and BSMR-716 (mid-late) were observed under field condition. The results revealed that in BDN-711 spraying at 50% bud formation stage was superior treatment where as in BSMR-736, BSMR-853 and BSMR-716 minimum incidence of *H. armigera* was recorded at flower initiation stage. The incidence of *E. atomosa* was recorded minimum, when the crop was sprayed at 50% flowering stage in all four cultivars.

Keywords: Crop phenology, *H. armigera,* Different cultivars of pigeonpea, emamectin benzoate, flubendiamide

Introduction
Pigeonpea (*Cajanas cajan* (L) Millsp.) is cultivated in more than 25 countries of the world on 4.59 million hectares areas with production of 3.28 million tons annually. The area, production and productivity of pigeonpea in India 5337.89 million ha, 4873.24 million tonnes and 913 kg per hectare, respectively during 2016-17. Whereas, leading pigeonpea growing states are Maharashtra, Uttar Pradesh, Madhya Pradesh, Bihar, West Bengal, Karnataka, Andhra Pradesh, Gujarat and Tamil Nadu. In Maharashtra, during 2016-17, it was grown on an area of 14.35 lakh ha, production 1495.75 lakh tons and productivity was 1042 kg per hectare. (Annon. 2017) [1].
Helicoverpa armigera (Hubner) has attained the key pest status due to its direct attack on fruiting bodies, voracious feeding habits, high mobility and fecundity, multivoltine and overlapping generations with facultative diapauses, nocturnal behaviour and migration, host selection and propensity for acquiring resistance against insecticides (Satpute and Sarode, 1995; Sarode, 1999) [5, 4]. Due to widespread use of insecticides pod borer has developed considerable levels of resistance to conventional insecticides including synthetic pyrethroids (Armes *et al,* 1992) [2]. The second most damaging pest of pigeonpea is *Exelastis atomosa* Walshigham (Lepidoptera: Pterophpridae). The young larvae bore into unopened flower buds for consuming the developing anthers. More damage is seen during flowering, pod maturing and pod filling stage. These varieties have different flowering periods which is most vulnerable stage of crop to insect attack. Therefore, a common recommendation regarding stage of crop and pest management can not satisfy the demand of optimum yield. Hence an attempt was made to find out the most effective time of spraying in respect to crop stage that can provide satisfactory pest control.

Resources and Material
The field experiment was conducted during *Kharif* 2016-17 at the experimental farm of the Department of Agril. Entomology, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani (MH). The experiment was laid on uniform, heavy black cotton soil having good fertility and drainage with cultivars as BDN- 711, BSMR- 716, BSMR-736 laid in split plot design with three replication plot 54 of size of 4.8 m x 4.2 m and spacing of 120 cm x 30 cm.

Treatment details

Spray No.	Name of Insecticides	Concentration (percent)	Dose per 10 litre of water
1st	Emamectin benzoate 5% SG	0.0022	4.4 g
2nd	Flubendiamide 39.3% SC	0.0078	3.9 ml

Main plot treatment: Variety
V1- BDN-711 (Early), V2 - BSMR-736 (Late) V3 -BSMR - 853 (Late) and V4 - BSMR-716 (Mid late),

Sub plot treatments: (Crop growth stages)
T_1: 1st spraying at bud initiation stage followed by 2nd spraying after 15 days
T_2: 1st spraying at 50% bud formation stage followed by 2nd spraying after 15 days
T_3: 1st spraying at flower initiation stage followed by 2nd spraying after 15 days
T_4: 1st spraying at 10% flowering stage followed by 2nd spraying after 15 days
T_5: 1st spraying at 50% flowering stage followed by 2nd spraying after 15 days
T_6: 1st spraying at pod formation stage followed by 2nd spraying after 15 days

Method of recording observations of larval population of *H. armigera*
Larval population of *H. armigera* was recorded at one day before and 1, 3, 7 and 14 days after each application of insecticides on five randomly selected plants from each treatment. The data obtained in insect numbers were subjected to poison formula $\sqrt{X+0.5}$ before further analysis. The analysis of pooled data was carried out to ascertain effect of different spraying dates on management of pod borer complex of pigeonpea and their effect on natural enemies of pod borer complex. Appropriate statistical methods were employed to work out standard error (SE) and critical difference (CD) to know the significance of treatments.

Effect of different dates of spraying against *H. armigera* after first spray
Data pertaining to the effect of different dates of spraying on management of *H. armigera* after first spray are presented in Table 1.

Performance of different varieties against *H. armigera*
The minimum number of larvae per plant was recorded in V_1-BDN-711 and V_4- BSMR-716 (0.61 larvae/plant) it was statistically at par with variety BSMR-853 one day after first spray. In case of third day after first spray the minimum larval count was observed in V_1- BDN-711 (0.78 larvae/plant) and it was at par with rest of all cultivars. At seventh day after first spray minimum larval count was found in V_1- BDN-711 (0.83 larvae/plant) and it was at par with treatment V_2- BSMR-736. However, at fourteenth day after first spray least larval count was observed on V_3- BSMR-853 (1.23 larvae/plant) and it was at par with rest of the all treatments.

Effect of spray schedules on incidence of *H. armigera*
The data presented in Table 9 revealed that pre-count observations were non-significant. Further larval population of *H. armigera* recorded at different days after first spray showed significant differences among various crop growth stages.
One day after first spray, (0.42 larvae/plant) was observed when the crop was sprayed at T_3- flower initiation stage. However, it was found at par with treatments T_4- crop sprayed at 10% flowering stage (0.50 larvae/plant). On third day after first spray the minimum count (0.50 larvae/plant) was observed when crop was sprayed at flower initiation stage and performed as most superior treatment over rest of the treatments. At seventh day after first spray least count (0.75 larvae/plant) were observed when crop was sprayed at flower initiation stage and found at par with T_2-50% bud formation stage (0.92 larvae/plant) and T_4 - 10% flowering stage(0.83 larvae/plant). The observation recorded at fourteenth day after first spray, minimum count was observed when crop was sprayed at 10% flowering stage (1.00 larvae/plant) which was at par with T_1- bud initiation stage, T_2-50% bud formation and T_3 - flower initiation stage.

Interaction effect
The data presented in Table 2 (1 day after 1st spray) showed that the lowest *H. armigera* population of 0.15 larvae/plant was observed in variety V_1- BDN-711 when crop was sprayed at T_2-50% bud formation stage and found at par with T_3-flower initiation stage. In V_2-BSMR-736, minimum larval count 0.53 larvae/plant was observed at T_3-flower initiation stage and it was statistically at par with treatments T_2 -50% bud formation stage (0.55 larvae/plant) and T_1- bud initiation stage (0.59 larvae/plant. In V_3-BSMR-853, the minimum count of 0.25 larvae/plant was observed at T_3-flower initiation stage. However in V_4-BSMR-716 lowest larval population (0.22 larvae/plant) was observed at T_3-flower initiation stage.
At third days after 1st spray showed that the lowest *H. armigera* population (0.21 larvae/plant) was observed in variety V_1- BDN-711 when crop was sprayed at 50% bud formation stage (T_2) and it was at par with spraying at flower initiation stage (T_3). In V_2- BSMR-736, the least larval count was observed when spraying was under taken at bud initiation stage (0.67 larvae/plant) which was at par with T_2-50% bud formation stage and T_3-flower initiation stage. In V_3- BSMR-853, the least count was observed when spraying was under taken at T_3-flower initiation stage (0.36 larvae/plant). It was at par with bud initiation stage (0.59 larvae/plant). In V_4-BSMR-716, lowest population was observed when crop was sprayed at T_3- flower initiation stage (0.39 larvae/plant) and it was at par with spraying at T_1-bud formation stage (0.62 larvae/plant). At 7 days after 1st spray showed that the lowest *H. armigera* population of 0.32 larvae/plant was observed in variety V_1- BDN-711 when crop was sprayed at T_2- 50% bud formation stage. Statistically it was found at par with flower initiation stage (0.41 larvae/plant).
In V_2-BSMR-736, lowest larval population (0.73 larvae/plant) was observed at T_3-flower initiation stage and found at par with T_1 and T_2. In V_3-BSMR-853, the minimum count of 0.44 larvae/plant was observed at T_3-Flower initiation stage and found at par with T_1- bud initiation stage and T_2- 50% bud formation stage. However in V_4-BSMR-716 lowest larval population 0.46 larvae/plant was observed at T_3-flower initiation stage and found at par with T_1- bud initiation stage.
At 14 days after 1st spray showed that the lowest *H. armigera* population of 0.44 larvae/plant was observed in variety V_1-BDN-711 when crop was sprayed at T_2- 50% bud formation stage and it was found at par with T_3-Flower initiation stage.

In V_2-BSMR-736 lowest larval population 0.78 larvae/plant was observed at T_3-10% flower initiation stage and was found at par with T_2- 50% bud formation stage and T_1- bud initiation stage. In V_3-BSMR-853, the minimum number of larvae (0.55 larvae/plant) was observed at T_3-Flower initiation stage and was found at par with treatment T_1 and T_2. However inV_4-BSMR-716 lowest larval population 0.55 larvae/plant was observed at T_3-Flower initiation stage which was found at par with T_1- bud initiation stage.

Effect of different dates of spraying against *H. armigera* after second spray

Data pertaining to effect of different dates of spraying on management of *H. armigera* after second spray are presented in Table 1.

Varietal performance against *H. armigera*

The number of larvae/plant was significantly different in different pigeonpea cultivars. The minimum count of 0.72 larvae/ plant was recorded in V_1- BDN-711 one day after second spray and it was significantly superior over all treatments. In case of third, seventh and fourteenth day after second spray the minimum larval count (1.06, 1.33 and 1.50 larvae/plant, respectively) was observed in V_1- BDN-711 and it was at par with V_2-BSMR-736 and V_3-BSMR-853. Highest count was observed onV_4-BSMR-716 at all days of observations.

Effect of spray schedule on incidence of *H. armigera*

On one day after second spray, the least number of *H. armigera* (0.67 larvae/plant) was observed when the crop was sprayed at T_3-flower initiation stage. However, it was found at par with all treatments except T_5- 50% flowering stage. On third day after second spray the minimum number of *H. armigera* 0.83 larvae/plant were observed when crop was sprayed at T_3- flower initiation stage and T_4- 10% flowering stage which was statistically at par with T_1-bud initiation stage and T_6-pod formation stage. The observation recorded at 7 DAS indicated that lowest 0.92 larvae/plant were observed when spraying was taken at T_3- flower initiation stage which was significantly superior over rest of the treatments. On fourteenth day after second spray the minimum count of 1.17 larvae/plant was observed when crop was sprayed at T_3- flower initiation stage which was statistically at par with T_6- pod formation stage and T_4- 10% flowering stage.

Interaction effect

The data presented in Table 3 at one day after second spraying showed that the least population 0.29 larvae/plant was observed in variety V_1-BDN-711 when crop was sprayed at T_2- 50% bud formation stage which was at par with T_1- bud initiation stage and T_3- flower initiation stage.

In cultivar BSMR-736, BSMR-853 and BSMR-716, minimum larval population (0.62, 0.40 and 0.38 larvae/plant, respectively) was observed in T_3- spraying at flower initiation stage and it was at par with T_1- bud initiation stage and T_2- 50% bud formation stage. At third day after second spray the lowest population of 0.38 larvae/plant was observed in variety V_1- BDN-711 when spraying was administered at T_2 - 50% bud formation stage. This treatment was found at par with T_3 - spraying at flower initiation stage and T_1- bud initiation stage. The observations recorded in respect of cultivars BSMR-736 and BSMR-716 clearly revealed that the crop sprayed at T_3- flower initiation stage recorded least larval count (0.72 and 0.55 larvae/plant) and found at par with T_1- bud initiation stage and T_2-50% bud formation stage. In BSMR-853 least larval count (0.51 larvae/plant) at bud initiation stage and which was at par with treatments T_2 and T_3. At 7th days after second spray revealed that the lowest population of 0.51 larvae/plant was observed in variety V_1- BDN-711 when crop was sprayed at T_2- 50% bud formation stage and it was at par with T_1- bud initiation stage and T_3- spraying at flower initiation stage. In V_2- BSMR-736 and V_4- BSMR-716 lowest number of larvae/plant was observed in T_3 *i.e.* spraying at flower initiation stage (0.85 and 0.68 larvae/plant) and it was at par with T_1- bud initiation stage and T_2-50% bud formation stage. Whereas in V_3-BSMR-853 least count was 0.68 larvae/plant when crop was sprayed at bud initiation stage. At fourteenth days lowest population of 0.59 larvae/plant was observed in variety V_1- BDN-711 when spraying was taken at T_2- 50% bud formation stage. It was found at par with T_1- bud initiation stage and T_3 - flower initiation stage. In V_2 -BSMR-736 minimum number of larvae/plant was observed when crop was sprayed at T_2- 50% bud formation stage (0.85 larvae/plant) was found at par with T_1- bud initiation stage and T3-flower initiation stage. Spraying taken at flower initiation stage emerged as most superior treatment in respect of BSMR-853 and BSMR-716. However, this treatment was statistically at par with T_1- bud initiation stage and T_2- 50% bud formation stage.

The reviews regarding effect of spraying dates applied at various crop growth stages and there interaction are quite meagre since this is a new affect to study in entomological research. The work done and reviews reported by earlier worker regarding parallel issues are being presented here Raut *et al*. (2016) [3] reported that the application of insecticides at bud initiation stage followed by 50% flowering stage 15 days after 50% flowering were proved better, recording minimum 3.74 and 3.73 percent damage by lepidopteran pest on green pod. The above findings are supported by the findings of (Shinde *et al.* 2017) [6] They found that 1st spray treatments *H. armigera* counts was in the range of 1.48 to 1.59 larvae/plant and before 2nd spray it ranged from 1.91 to 2.15 larvae/ plant. The minimum *H. armigera* population was observed in treatment V1 (BDN-711) followed by V2 (BSMR-716) and V3 (BSMR-736) after 1st and 2nd spray.

Table 1: Effect of different varieties and spray schedules against *H. armigera* after 1st and 2nd spray

Treatment	Pre count	Days after first spray (No. of larvae/plant)				Pre count	Days after second spray (No. of larvae/plant)			
		1	3	7	14		1	3	7	14
A. Main treatment: Variety						**A. Main treatment: Variety**				
V1-BDN-711	1.33	0.61	0.78	0.83	1.26	1.89	0.72	1.06	1.33	1.50
	(1.35)	(1.05)	(1.13)	(1.15)	(1.32)	(1.55)	(1.11)	(1.25)	(1.35)	(1.41)
V2- BSMR-736	1.78	0.78	0.83	1.00	1.44	2.11	1.28	1.39	1.67	1.83
	(1.51)	(1.13)	(1.15)	(1.22	(1.39	(1.62)	(1.33)	(1.37)	(1.47)	(1.53)
V3- BSMR-853	1.61	0.72	1.00	1.17	1.23	2.06	1.11	1.22	1.56	1.72
	(1.45)	(1.11)	(1.22)	(1.29)	(1.31)	(1.60)	(1.27)	(1.31)	(1.43)	(1.49)
V4- BSMR-716	1.56	0.61	0.83	1.16	1.32	2.50	1.39	1.56	2.11	2.39
	(1.43)	(1.05)	(1.15)	(1.29)	(1.35)	(1.73)	(1.37)	(1.43)	(1.62)	(1.70)
S.E. ±	0.05	0.2	0.3	0.3	0.4	0.07	0.04	0.05	0.05	0.06
CD at 5%	NS	0.07	0.09	0.11	0.12	NS	0.13	0.14	0.17	0.18
B. Sub treatment: Spray schedule						B. Sub treatment: Spray schedule				
T1	1.50	0.67	0.75	1.17	1.30	2.00	0.75	1.00	1.75	1.92
	(1.41)	(1.08)	(1.12)	(1.29)	(1.34)	(1.58)	(1.12)	(1.22)	(1.50)	(1.55)
T2	1.42	0.58	0.83	0.92	1.38	2.08	0.92	1.33	1.67	1.83
	(1.38)	(1.04)	(1.15)	(1.19)	(1.37)	(1.61)	(1.19)	(1.35)	(1.47)	(1.53)
T3	1.58	0.42	0.50	0.75	1.21	1.58	0.67	0.83	0.92	1.17
	(1.44)	(0.96)	(1.00)	(1.12)	(1.31)	(1.44)	(1.08)	(1.15)	(1.19)	(1.29)
T4	1.50	0.50	0.67	0.83	1.00	2.17	0.75	0.83	1.58	1.67
	(1.41)	(1.00)	(1.08)	(1.15)	(1.22)	(1.63)	(1.12)	(1.15)	(1.44)	(1.47)
T5	1.67	0.92	1.08	1.24	1.42	3.25	2.75	2.83	2.92	3.00
	(1.47)	(1.19)	(1.26)	(1.32)	(1.38)	(1.94)	(1.80)	(1.83)	(1.85)	(1.87)
T6	1.75	0.83	1.25	1.33	1.56	1.75	0.92	1.00	1.17	1.58
	(1.50)	(1.15)	(1.32)	(1.35)	(1.44)	(1.50)	(1.19)	(1.22)	(1.29)	(1.44)
S.E. ±	0.06	0.03	0.03	0.04	0.05	0.09	0.05	0.06	0.07	0.07
CD at 5%	NS	0.06	0.07	0.14	0.15	NS	0.16	0.17	0.21	0.23
C. Interaction (V X T)						C. Interaction (V X T)				
S.E. ±	0.12	0.06	0.07	0.09	0.10	0.18	0.11	0.12	0.14	0.15
CD at 5%	NS	0.17	0.22	0.27	0.30	NS	0.32	0.35	0.42	0.46
GM	1.54	0.63	0.85	1.11	1.27	2.28	1.14	1.32	1.74	1.92

*Figures in parentheses are $\sqrt{X + 0.5}$ transformed values NS: Non Significant

Table 2: Interaction effect of variety and spray schedules on incidence of *H. armigera* 1st, 3rd, 7th and 14th day after 1st spray

V X T	No. larvae/plant 1 day after 1 spray						No. larvae/plant 3 day after 1 spray					
	T_1	T_2	T_3	T_4	T_5	T_6	T_1	T_2	T_3	T_4	T_5	T_6
V_1-BDN-711	0.33	0.15	0.18	1.00	2.15	1.95	0.55	0.21	0.31	1.11	2.51	2.01
	(0.91)	(0.81)	(0.82)	(1.22)	(1.63)	(1.57)	(1.02)	(0.84)	(0.90)	(1.27)	(1.73)	(1.58)
V_2-BSMR-736	0.59	0.55	0.53	1.35	2.62	2.32	0.67	0.71	0.69	1.38	2.91	2.3
	(1.04)	(1.02)	(1.01)	(1.36)	(1.77)	(1.68)	(1.08)	(1.10)	(1.09)	(1.37)	(1.85)	(1.67)
V_3-BSMR-853	0.48	0.44	0.25	1.25	2.41	2.12	0.59	0.65	0.36	1.29	2.66	2.10
	(0.99)	(0.97)	(0.87)	(1.32)	(1.71)	(1.62)	(1.04)	(1.07)	(0.93)	(1.34)	(1.78)	(1.61)
V_4-BSMR-716	0.52	0.42	0.22	1.17	2.36	2.00	0.62	0.69	0.39	1.22	2.74	2.25
	(1.01)	(0.96)	(0.85)	(1.29)	(1.69)	(1.58)	(1.06)	(1.09)	(0.94)	(1.31)	(1.80)	(1.66)
S.E. ±	0.03						0.04					
C.D.at 5%	0.08						0.13					

V X T	No. larvae/plant 7 day after 1 spray						No. larvae/plant 14 day after 1 spray					
	T_1	T_2	T_3	T_4	T_5	T_6	T_1	T_2	T_3	T_4	T_5	T_6
V_1-BDN-711	0.75	0.32	0.41	1.22	2.66	(2.22	0.82	0.44	0.53	1.45	2.88	2.42
	(1.12)	(0.91)	(0.95)	(1.31)	(1.78)	(1.65)	(1.15)	(0.97)	(1.01)	(1.40)	(1.84)	(1.71)
V_2-BSMR-736	0.78	0.82	0.73	1.44	3.10	2.45	0.87	0.79	0.78	1.58	3.22	2.85
	(1.13)	(1.15)	(1.11)	(1.39)	(1.90)	(1.72)	(1.17)	(1.14)	(1.13)	(1.44)	(1.93)	(1.83)
V_3-BSMR-853	0.66	0.72	0.44	1.32	2.88	2.20	0.79	0.85	0.55	1.40	2.99	2.65
	(1.08)	(1.10)	(0.97)	(1.35)	(1.84)	(1.64)	(1.14)	(1.16)	(1.02)	(1.38)	(1.87)	(1.77)
V_4-BSMR-716	0.69	0.84	0.46	1.39	2.98	2.19	0.78	0.89	0.55	1.57	3.01	2.49
	(1.09)	(1.16)	(0.98)	(1.37)	(1.87)	(1.64)	(1.13)	(1.18)	(1.02)	(1.44)	(1.87)	(1.73)
S.E. ±	0.05						0.05					
C.D.at 5%	0.15						0.15					

Table 4: Interaction effect of variety and spray schedules on incidence of *H. armigera* 1st, 3rd, 7th and 14th day after 2nd spray

V X T	No. larvae/plant 1 day after 2 spray						No. larvae/plant 3 day after 2 spray					
	T_1	T_2	T_3	T_4	T_5	T_6	T_1	T_2	T_3	T_4	T_5	T_6
V_1-BDN-711	0.57	0.29	0.38	1.51	3.62	2.85	0.64	0.38	0.55	1.62	3.91	2.91
	(1.03)	(0.89)	(0.94)	(1.42)	(2.03)	(1.83)	(1.07)	(0.94)	(1.02)	(1.46)	(2.10)	(1.85)
V_2-BSMR-736	0.82	0.72	0.62	1.65	4.22	3.28	0.98	0.91	0.72	1.78	4.08	3.32
	(1.15)	(1.10)	(1.06)	(1.47)	(2.17)	(1.94)	(1.22)	(1.19)	(1.10)	(1.51)	(2.14)	(1.95)
V_3-BSMR-853	0.67	0.62	0.40	1.53	3.70	3.49	0.51	0.62	0.53	1.75	4.14	3.55
	(1.08)	(1.06)	(0.95)	(1.42)	(2.05)	(2.00)	(1.00)	(1.06)	(1.01)	(1.50)	(2.15)	(2.01)
V_4-BSMR-716	0.78	0.68	0.38	1.60	4.13	3.55	0.94	0.78	0.55	1.85	4.39	3.69
	(1.13)	(1.09)	(0.94)	(1.45)	(2.15)	(2.01)	(1.20)	(1.13)	(1.02)	(1.53)	(2.21)	(2.05)
S.E. ±	0.07						0.08					
C.D.at 5%	0.22						0.23					

V X T	No. larvae/plant 7 day after 2 spray						No. larvae/plant 14 day after 2 spray					
	T_1	T_2	T_3	T_4	T_5	T_6	T_1	T_2	T_3	T_4	T_5	T_6
V_1-BDN-711	0.71	0.51	0.61	1.91	4.05	3.00	0.80	0.59	0.69	2.10	4.36	3.33
	(1.10)	(1.00)	(1.05)	(1.55)	(2.13)	(1.87)	(1.14)	(1.04)	(1.09)	(1.61)	(2.20)	(1.96)
V_2-BSMR-736	1.17	1.15	0.85	2.1	3.81	3.44	1.25	0.85	0.90	2.23	3.20	3.52
	(1.29)	(1.28)	(1.16)	(1.61)	(2.08)	(1.98)	(1.32)	(1.16)	(1.18)	(1.65)	(1.92)	(2.00)
V_3-BSMR-853	0.68	0.95	0.72	2.15	3.8	3.62	1.00	1.10	0.85	2.31	3.96	3.72
	(1.09)	(1.20)	(1.10)	(1.63)	(2.07)	(2.03)	(1.22)	(1.26)	(1.16)	(1.68)	(2.11)	(2.05)
V_4-BSMR-716	1.00	0.97	0.68	2.22	4.06	3.78	1.10	1.02	0.76	2.27	4.12	3.85
	(1.22)	1.21)	(1.09)	(1.65)	(2.14)	(2.07)	(1.26)	(1.23)	(1.12)	(1.66)	(2.15)	(2.09)
S.E. ±	0.09						0.13					
C.D.at 5%	0.27						0.38					

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