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## Fruit damage by rose-ringed parakeet, *Psittacula krameri* (Scopoli) in pomegranate orchard

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### Abstract

Loss of production in pomegranate orchard due to rose-ringed parakeet, *Psittacula krameri* (Scopoli) was observed as 6.38 per cent. Fruit damage and number of parakeet bird was higher in morning hours than evening hours.

**Keywords:** Rose-ringed parakeet, pomegranate, “V” shape mark

### Introduction

Pomegranate (*Punica granatum* L.) can be considered as one of the most ideal crops for dry Deccan Plateau region of India. Its cultivation has become highly remunerative agriculture business in India. The parakeet has acquired the status as a serious vertebrate pest for the agricultural and horticultural crops (Shafi *et al.* 1986; Khan & Beg, 1998) <sup>[7, 2]</sup>. Seven species of birds were recorded in pomegranate orchards in India, of which rose-ringed parakeets (*P. krameri*) and house crow (*Corvus splendens*) were predominant and inflicting damage to the fruits in Punjab (Malhi and Kaur, 1998). The parakeet is the most common and the destructive bird of India which inflicts huge damage to grain of standing crops, orchard fruits and vegetable crops. (Kushwaha and Prabhat, 2004). Khan *et al.* (2006) <sup>[3]</sup> reported 20.1% - 40% damage by parakeet on Guava fruits. Fruits and vegetables form an important part of the economy of India. The rose-ringed parakeet serves as the worst vertebrate pest of India not only damages the food sources, but also causes considerable economic losses to farmers and national economy. Due to its wide feeding niche, it is regarded as one of the most destructive vertebrate pests. Thus, the present experiment was planning to assess parakeet depredation on pomegranate fruits.

### Materials and Methods

The present study was carried out in middle Gujarat, Taluka: Dholka, Village: Nesda (Latitude: 22.7023, Longitude: 72.4329). Net plot size was 50 m X 30 m. Total 20 trees of Super Bhagwa variety of pomegranate was selected from Nesda village of dholka (Plate-1) and tagged for observation. Observation of parakeet damage by observing ‘V’ shape marking on fresh fruit was recorded from March to November. Depredations on fruits were estimated through direct field observations. Observations were recorded during morning (7:30 am to 9:30 am) and evening (5:00 pm to 7:00 pm). Parakeet depredations inflicted fruits were numbered, weighed.

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Experimental orchard, Farmer's field, Dholka



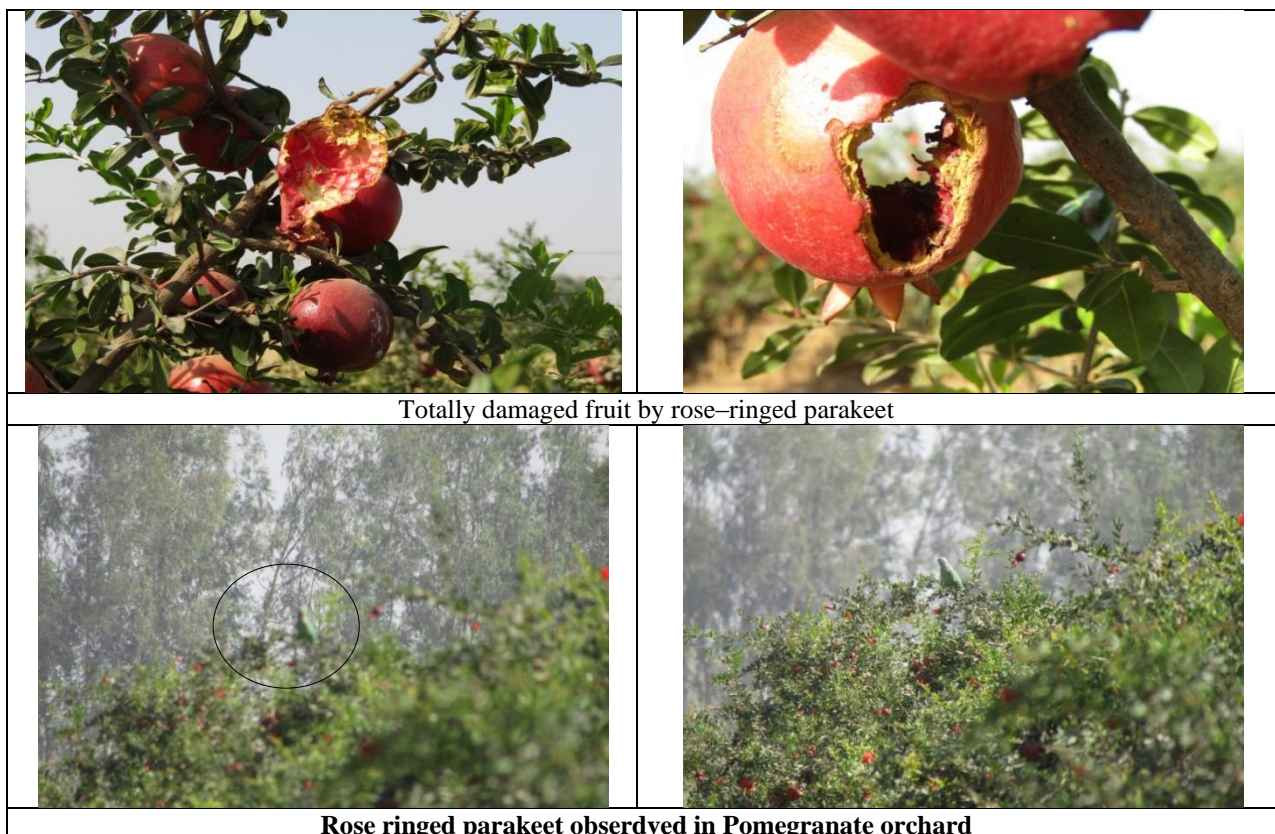
Tagging of Pomegranate tree



Healthy pomegranate fruits in orchard, Dholka



Damaged fruit by rose-ringed parakeet



**Plate 1:** Experimental view of Pomegranate orchard and damaged fruit by Rose ringed parakeet.

**Result and Discussion**

During the period, total 560 observations were recorded for visitation of parakeet on pomegranate tree. Average 17.57 mean number of birds was recorded in pomegranate orchard during morning, while average 11.59 mean numbers of birds was recorded during evening in the year 2019 (Table-1). Average 1.92 mean numbers of birds was recorded in pomegranate orchard during morning, while average 1.51

mean numbers of birds was recorded during evening in the year 2021 (Table-2). So, after pooled over period over years, Average 7.51 mean number of birds was recorded in pomegranate orchard during morning, while average 5.11 mean numbers of birds was recorded during evening (Table-3). Difference in bird visitation during both periods was found statistically significant (Table: 4 to 6).

**Table 1:** Number of parakeet and damaged fruit in pomegranate orchard at weekly interval (2019)

Observation week	Average number of parakeet/2 hr at 10 minute interval/tree			
	Morning parakeet		Evening parakeet	
	parakeet	Damage	Parakeet	Damage
1	11.55	0.55	5.35	0.40
2	21.65	0.55	17.1	0.25
3	20.55	0.85	11.15	0.35
4	28.4	0.70	20.5	0.40
5	24.9	1.25	14.5	0.60
6	21.15	1.40	15	0.70
7	21.35	1.30	13.3	0.60
8	16.05	0.85	14.3	1.00
9	5.85	0.60	2.9	0.65
10	4.25	0.75	1.8	0.50
Total	175.70	8.80	115.90	5.45
Average	17.57	0.88	11.59	0.55

**Table 2:** Number of parakeet and damaged fruit in pomegranate orchard at weekly interval (2021)

Observation week	Average number of parakeet/2 hr at 10 minute interval/tree			
	Morning parakeet		Evening parakeet	
	parakeet	Damage	parakeet	Damage
1	1.05	0.20	0.90	0.25
2	1.65	0.25	1.10	0.20
3	1.20	0.45	1.00	0.35
4	1.80	0.55	1.50	0.25

5	1.55	0.60	1.05	0.35
6	1.40	0.40	1.20	0.35
7	1.90	0.50	1.60	0.40
8	0.95	0.55	0.70	0.45
9	1.75	0.45	1.55	0.45
10	1.50	0.35	1.05	0.45
11	2.15	0.35	1.90	0.20
12	2.55	0.35	2.00	0.20
13	1.90	0.70	1.45	0.10
14	2.30	0.45	1.85	0.20
15	2.65	0.95	2.10	0.30
16	3.00	1.05	2.40	0.60
17	2.75	1.10	2.05	0.45
18	2.45	0.85	1.80	0.85
Total	34.50	10.10	27.20	6.40
average	1.92	0.56	1.51	0.36

Note: total parakeet per 20 plants in each period

Table 3: Parakeet visitation in pomegranate orchard at weekly interval (pooled)

Observation week	Average number of parakeet/2 hr at 10 minute interval/tree			
	Morning parakeet		Evening parakeet	
	Parakeet	Damage	Parakeet	Damage
1	11.55	0.55	5.35	0.4
2	21.65	0.55	17.1	0.25
3	20.55	0.85	11.15	0.35
4	28.4	0.7	20.5	0.4
5	24.9	1.25	14.5	0.6
6	21.15	1.4	15	0.7
7	21.35	1.3	13.3	0.6
8	16.05	0.85	14.3	1
9	5.85	0.6	2.9	0.65
10	4.25	0.75	1.8	0.5
11	1.05	0.2	0.9	0.25
12	1.65	0.25	1.1	0.2
13	1.2	0.45	1	0.35
14	1.8	0.55	1.5	0.25
15	1.55	0.6	1.05	0.35
16	1.4	0.4	1.2	0.35
17	1.9	0.5	1.6	0.4
18	0.95	0.55	0.7	0.45
19	1.75	0.45	1.55	0.45
20	1.5	0.35	1.05	0.45
21	2.15	0.35	1.9	0.2
22	2.55	0.35	2	0.2
23	1.9	0.7	1.45	0.1
24	2.3	0.45	1.85	0.2
25	2.65	0.95	2.1	0.3
26	3	1.05	2.4	0.6
27	2.75	1.1	2.05	0.45
28	2.45	0.85	1.8	0.85
Total	210.20	18.90	143.10	11.85
average	7.51	0.68	5.11	0.42

Table 4: Visit of Rose ringed parakeet, *Psittacula krameri* during morning and evening in experimental plot (Year 2019)

Variable (Pair 1)	N	Mean	Std. deviation	Std. Error Mean
Morning Parakeet	200	17.57	8.317	0.588
Evening Parakeet	200	11.59	6.583	0.466
Paired Sample T- Test				
Pair 1	T	Df	Sig. (2- tailed)	
Pair t Test	17.336**	199	0.00	

\*\*significant at 1%

N means number of observation during study period

**Table 5:** Visit of Rose ringed parakeet, *Psittacula krameri* during morning and evening in experimental plot (Year 2021)

Variable (Pair 1)	N	Mean	Std. deviation	Std. Error Mean
Morning Parakeet	360	1.92	1.146	0.060
Evening Parakeet	360	1.51	1.156	0.061
Paired Sample T- Test				
Pair 1	T	Df	Sig. (2- tailed)	
Pair t Test	6.748**	359	0.00	

\*\*significant at 1%

N means number of observation during study period

\*In year 2020, data was not collected because observation period falls under covid-19.

**Table 6:** Visit of Rose ringed parakeet, *Psittacula krameri* during morning and evening in experimental plot (pooled)

Variable (Pair 1)	N	Mean	Std. deviation	Std. Error Mean
Morning Parakeet	560	7.51	9.046	0.382
Evening Parakeet	560	5.11	6.297	0.266
Paired Sample T- Test				
Pair 1	T	Df	Sig. (2- tailed)	
Pair t Test	13.980**	559	0.00	

\*\*significant at 1%

\*In year 2020, data was not collected because observation period falls under covid-19.

The mean fruit damage by parakeet was 0.88% and 0.55% recorded (Plate-1) in morning and evening period, respectively (Table-7). The mean fruit damage by parakeet was 0.56 % and 0.36 % recorded in morning and evening

period, respectively (Table-8). The mean fruit damage by parakeet was 0.68% and 0.42% recorded in morning and evening period, respectively (Table-9). The difference of bird damage was significant statistically.

**Table 7:** Intensity of rose–ringed parakeet depredations in experimental plot (Year 2019)

Variable (Pair 1)	N	Mean	Std. deviation	Std. Error Mean
Morning Damage	200	0.88	0.747	0.053
Evening Damage	200	0.55	0.608	0.043
Paired Sample T- Test				
Pair 1	T	Df	Sig. (2- tailed)	
Pair t Test	5.242**	199	0.00	

\*\*significant at 1%

**Table 8:** Intensity of rose –ringed parakeet depredations in experimental plot (2021)

Variable (Pair 1)	N	Mean	Std. deviation	Std. Error Mean
Morning Damage	360	0.56	0.626	0.033
Evening Damage	360	0.36	0.608	0.027
Paired Sample T- Test				
Pair 1	T	Df	Sig. (2- tailed)	
Pair t Test	5.268**	359	0.00	

\*\*significant at 1%

\*In year 2020, data was not collected because observation period falls under covid-19.

**Table 9:** Intensity of rose –ringed parakeet depredations in experimental plot. (pooled)

Variable (Pair 1)	N	Mean	Std. deviation	Std. Error Mean
Morning Damage	560	0.68	0.688	0.029
Evening Damage	560	0.42	0.556	0.023
Paired Sample T- Test				
Pair 1	T	Df	Sig. (2- tailed)	
Pair t Test	7.409**	559	0.00	

\*\*significant at 1%

\*In year 2020, data was not collected because observation period falls under covid-19.

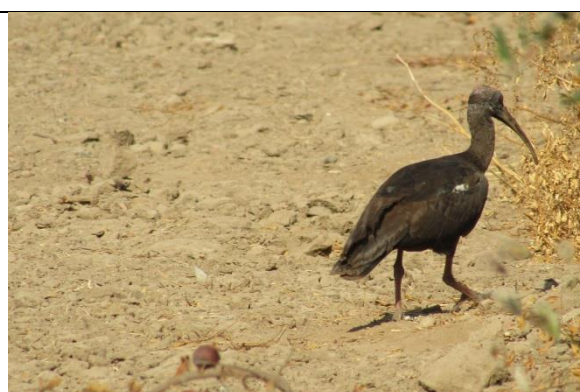
Other bird community also recorded during study period (Plate-2).

**Table 10:** List of Birds visiting in experimental plot at farmer’s farm, Dholka

Sr. No	Name of bird	Scientific Name
1	Rose- Ringed Parakeet	<i>Psittacula krameri</i> (Scopoli)
2	Purple Sunbird	<i>Nectarinia asiatica</i> (Latham)
3	Red vented bulbul	<i>Pycnonotus cafer</i> (Linnaeus)
4	Common Pigeon	<i>Columba liviadomestica</i> (Gmelin)
5	House Sparrow	<i>Passer domesticus</i> (Linnaeus)
6	Indian pea fowl	<i>Pavo cristatus</i> (Linnaeus)
7	Black Drongo	<i>Dicrurus macrocercus</i> (Vieillot)
8	Greater Coucal	<i>Centropus sinensis</i> (Stephens)
9	Common Myna	<i>Acridotheres tristis</i> (Linnaeus)
10	House crow	<i>Corvus splendens</i> (Vieillot)
11	Red Wattle Lapwing	<i>Vanellus indicus</i> (Boddaert)
12	Red naped Ibis	<i>Pseudibis papillosa</i> (Temminck)
13	Cattle Egret	<i>Bubulcus ibis</i> (Linnaeus)
14	Bee eater	<i>Merops orientalis</i> (Rafinesque)
15	Rosy starling	<i>Sturnus roseus</i> (Linnaeus)
16	Indian roller	<i>Coracias benghalensis</i> (Linnaeus)



House Sparrow in Pomegranate Orchard



Black Ibis in Pomegranate Orchard



Egg of Eurasian Collared Dove in Pomegranate Orchard



Red-wattled Lapwing in Pomegranate Orchard



Red-vented Bulbul in Pomegranate Orchard



Indian Roller in Pomegranate Orchard



**Plate 2:** View of other birds observed in Pomegranate Orchard during March-2019 to June-2019

Out of 20 sampled trees tested, 1756 number of total fruit, 113 was damaged and 2187 numbers were healthy. Average per cent fruit damage was 4.94 % while fruit yield was 98.71% per plant. Total weight of damaged fruit and healthy fruit was 1.33 kg/plant and 34.71 kg/plant, respectively. So, yield obtained as 38,528 kg per hectare after parakeet depredation (Table-11). Out of 20 sampled trees tested, 2300 number of total fruit, 146 was damaged and 1610 numbers were healthy. Average per cent fruit damage was 8.30 % while fruit yield was 165.96% per plant. Total weight of

damaged fruit and healthy fruit was 1.75 kg/plant and 25.76 kg/plant, respectively. So, yield obtained as 28,594 kg per hectare after parakeet depredation (Table-12). Out of 20 sampled trees tested, 2028 number of total fruit, 129.50 was damaged and 1898.50 numbers were healthy. Average per cent fruit damage was 6.38 % while fruit yield was 93.62% per plant. Total weight of damaged fruit and healthy fruit was 1.05 kg/plant and 26.04 kg/plant, respectively. So, yield obtained as 28,904 kg per hectare after parakeet depredation (Table-13).

**Table 11:** Total pomegranate fruits and weight after parakeet predation in experimental plot. (2019)

No. of tree	Number of Fruits/ tree			Total weight of fruits/tree (kg)		Fruit damage (%)
	Total fruit	Damaged fruit	Healthy Fruit	Damaged fruit	Healthy Fruit	
1	130	19	111	4.32	35.52	14.62
2	128	7	121	1.68	38.72	5.47
3	127	5	122	1.20	39.04	3.94
4	116	7	109	1.92	34.88	6.03
5	115	7	108	1.68	34.56	6.09
6	112	4	108	0.96	34.56	3.57
7	101	7	94	1.20	30.08	6.93
8	113	4	109	0.96	34.88	3.54
9	112	2	110	0.48	35.2	1.79
10	113	3	110	0.72	35.2	2.65
11	121	5	116	1.20	37.12	4.13
12	124	4	120	0.96	38.4	3.23
13	130	5	125	1.20	40	3.85
14	132	6	126	1.44	40.32	4.55
15	127	5	122	1.20	39.04	3.94
16	120	3	117	0.72	37.44	2.50
17	109	4	105	0.96	33.6	3.67
18	102	5	97	1.20	31.04	4.90
19	92	5	87	1.20	27.84	5.43
20	76	6	70	1.44	16.8	7.89
Total	2300	113	2187	26.64	694.24	98.71
Mean	115	5.65	109.35	1.33	34.71	4.94
Yield/Ha	-	-	-	-	38,528	

**Table 12:** Total pomegranate fruits and weight after parakeet predation in experimental plot (2021)

No. of tree	Number of Fruits/ tree			Total weight of fruits/tree (kg)		Fruit damage (%)
	Total fruit	Damaged fruit	Healthy Fruit	Damaged fruit	Healthy Fruit	
1	91	22	69	5.28	22.08	24.18
2	93	10	83	2.40	26.56	10.75
3	85	8	77	1.92	24.64	9.41
4	96	8	88	1.92	28.16	8.33
5	91	9	82	2.16	26.24	9.89
6	71	3	68	0.72	21.76	4.23
7	81	7	74	1.68	23.68	8.64

8	92	5	87	1.20	27.84	5.43
9	87	3	84	0.72	26.88	3.45
10	95	4	91	0.96	29.12	4.21
11	89	7	82	1.68	26.24	7.87
12	96	5	91	1.20	29.12	5.21
13	97	6	91	1.44	29.12	6.19
14	89	9	80	2.16	25.60	10.11
15	94	7	87	1.68	27.84	7.45
16	83	4	79	0.96	25.28	4.82
17	76	6	70	1.44	22.40	7.89
18	87	5	82	1.20	26.24	5.75
19	86	9	77	2.16	24.64	10.47
20	77	9	68	2.16	21.76	11.69
Total	1756	146	1610	35.04	515.20	165.96
Mean	87.8	7.3	80.5	1.75	25.76	8.30
Yield/Ha	-	-	-	-	28,594	-

**Table 13:** Total pomegranate fruits and weight after parakeet predation in experimental plot (pooled)

No. of tree	Number of Fruits/ tree			Total weight of fruits/tree (kg)		Fruit damage (%)
	Total fruit	Damaged fruit	Healthy Fruit	Damaged fruit	Healthy Fruit	
1	110.5	20.5	90	3.38	24.80	18.55
2	110.5	8.5	102	1.34	28.18	7.69
3	106	6.5	99.5	1.05	27.66	6.13
4	106	7.5	98.5	1.29	27.52	7.08
5	103	8	95	1.29	25.79	7.77
6	91.5	3.5	88	0.68	24.21	3.83
7	91	7	84	1.19	23.02	7.69
8	102.5	4.5	98	0.73	27.22	4.39
9	99.5	2.5	97	0.39	30.05	2.51
10	104	3.5	100.5	0.56	26.95	3.37
11	105	6	99	0.95	27.25	5.71
12	110	4.5	105.5	0.73	28.32	4.09
13	113.5	5.5	108	0.95	30.11	4.85
14	110.5	7.5	103	1.17	28.96	6.79
15	110.5	6	104.5	0.95	28.24	5.43
16	101.5	3.5	98	0.56	27.02	3.45
17	92.5	5	87.5	0.78	23.94	5.41
18	94.5	5	89.5	0.85	24.24	5.29
19	89	7	82	1.05	21.80	7.87
20	76.5	7.5	69	1.17	15.54	9.80
Total	2028	129.5	1898.5	21.06	520.77	127.69
Mean	101.4	6.48	94.93	1.05	26.04	6.38
Yield/Ha	-	-	-	-	28,904	-

## Conclusions

Difference in bird visitation during morning and evening period was found statistically significant. The fruit damage of 0.68% and 0.42% was recorded in morning and evening period, respectively. Out of 20 sampled trees tested, 2028 number of total fruit, 129.50 was damaged and 1898.50 numbers were healthy. Average per cent fruit damage was 6.38 % per tree. Total weight of damaged fruit and healthy fruit was 1.05 kg/plant and 26.04 kg/plant, respectively. So, yield obtained as 28,904 kg per hectare after parakeet depredation.

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