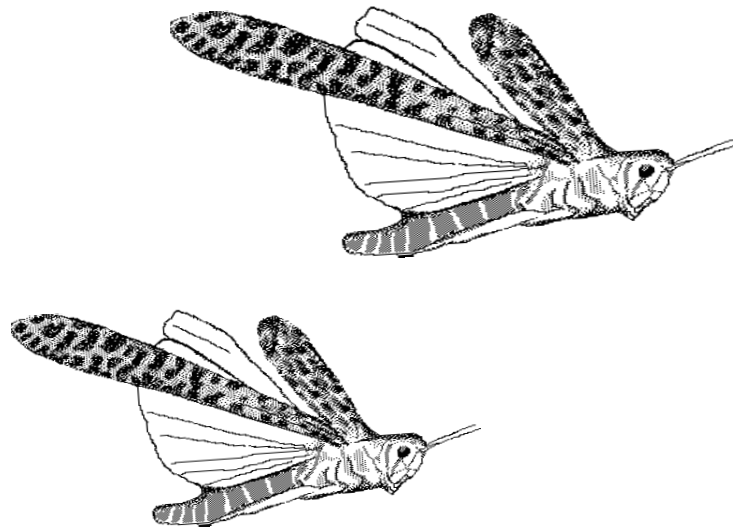


# Desert Locust Joint Border Survey in the Spring Breeding Areas of the I.R. Iran and Pakistan

April - May 1999



FOOD AND AGRICULTURE ORGANIZATION  
OF THE UNITED NATIONS

Rome, 1999





**Desert Locust Joint Border Survey  
in the Spring Breeding Areas  
of the I.R. Iran and Pakistan**

**April - May 1999**

**by**

**K. Cressman  
Ch. Muhammad Sadiq  
Eslam Shahrokhi  
S.M. Raziur Rehman  
Abdol Rashid Balouchi**

**FOOD AND AGRICULTURE ORGANIZATION  
OF THE UNITED NATIONS**  
Rome, May 1999

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations concerning the legal status of any country, territory, city or its authorities, or concerning the delimitation of its frontiers or boundaries.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying or otherwise, without the prior permission of the copyright owner. Applications for such permission, with a statement of the purpose and extent of the reproduction, should be addressed to the Director, Publications Division, Food and Agriculture Organization of the United Nations, Via delle Terme di Caracalla, 00100 Rome, Italy.

© FAO 1999

# CONTENTS

---

Summary and Recommendations .....	7
Acknowledgements .....	8
Introduction .....	9
Work Details .....	9
Conclusions and Recommendations .....	9
A. Desert Locust .....	9
B. Joint Survey of 2000 .....	10
<b>APPENDICES .....</b>	<b>11</b>
Appendix 1. Survey participants .....	13
Appendix 2. Itinerary and kilometer travelled/surveyed .....	15
Appendix 3. Desert Locust survey results .....	17
Appendix 4. Rainfall data .....	31
Appendix 5. Meteorological observations (I.R. Iran) .....	33
Appendix 6. Meteorological observations (Pakistan) .....	35
Appendix 7. Itinerary for 2000 .....	37
Appendix 8. Survey photos .....	39



# Summary and Recommendations

1. A joint border locust survey of the desert area of the Provinces of Sistan and Baluchistan, Hormozgan and Kerman of I.R. Iran, and Baluchistan of Pakistan, was carried out from 1 April to 4 May 1999. It was the fifth consecutive year for this survey and a distance of 8,523 km was covered, of which 4,534 km were in I.R. Iran and 3,989 km were in Pakistan .
2. Based on the recommendations of the second joint survey, 17 days were spent on survey in Pakistan and 13 days in I.R. Iran. This year, both teams had to stay four extra days in I.R. Iran awaiting Government clearance for the Iranian team to travel to Pakistan.
3. Two experts from Pakistan and two from I.R. Iran participated in the joint locust survey. During the survey in I.R. Iran, Mr. Keith Cressman (FAO Locust Forecasting Officer, Rome) provided on-the-job training to insure that the teams were knowledgeable in survey methodologies, and Mr. Mehdi Ghaemian (PPO Locust Information Officer, Tehran) assisted in interpretation between the two teams. Both Governments provided four 4WD vehicles for undertaking survey in their respective areas.
4. The survey costs were borne by the FAO Commission for Controlling the Desert Locust in the Eastern Region of its Distribution Areas in Southwest Asia.
5. Potential locust breeding areas of Saravan, Iranshahr, Chabahar, Jask, Kahnuj, Jiroft and Bam of I.R. Iran and Dalbandin, Kharan, Panjgur, Turbat, Pasni and Gwadar of Pakistan were surveyed during the period under report. The last three areas of I.R. Iran had not been visited during previous surveys (Appendix 8).
6. The survey was carried out by forming two teams, comprising of one expert from Pakistan and the other from I.R. Iran. More areas were covered by this method of survey.
7. A new survey route in I.R. Iran has been proposed by the joint survey team for the next survey in 2000 (see Appendix 7).
8. **Locust Situation**  
I.R. Iran. No locust swarms nor any gregarious/solitary breeding were observed from 2-13 April. Only insignificant numbers of solitary locust adults were observed in I.R. Iran on the Vashnam Plains (252323N/604610E) and on the southern coast at 252644N/594624E at an estimated density of 2.5 adults/ha and 2 adults/ha respectively (Appendix 3).  
Pakistan. No locust swarms nor any gregarious/solitary breeding were observed from 18 April to 4 May 1999. Only an insignificant numbers of solitary adults, at densities of 2.5 adults/ha, were observed in the interior near Kharan at Telli stream (281926N/653424E) and near Panjgur at Sorvan (265266N/635326E).
9. **Vegetation**  
Drought conditions prevailed in all the potential breeding areas of both countries due to no rainfall received after 6 March 1999 (Appendix 4).
10. **Rainfall**  
I.R. Iran. According to the rainfall data of I.R. Iran, a total of 89.2 mm rainfall was received at Saravan from January to April 1999, 55.8 mm at Iranshahr, 69 mm at Chabahar, 40.5 mm at Jask, 107 mm at Bandar-e-Abbas, 163.1 mm at Kahnuj, 109 mm at Jiroft, and 76 mm at Bam. Minab received comparatively good rainfall (207mm) during this period but the area was dry during the survey due to the absence of further rains (Appendices 4-5).  
Pakistan. Rainfall data from January to April, 1999 is presented in Appendix 6.

## **Acknowledgements**

The joint survey team is very much thankful to Mr. M. D. Mohsin, Plant Protection Adviser and Director General, Department of Plant Protection, Government of Pakistan and Mr. Aboutorab Vakili, Director of the Plant Protection Organization of I.R. Iran for their personal efforts in making the necessary arrangements and co-ordination for a successful joint locust survey between the two countries in 1999. The team also acknowledges the FAO Headquarters in Rome as well as the offices of the FAO Representations in Pakistan and I.R. Iran for their full assistance.

The survey team is also very much thankful to Mr. Keith Cressman, Locust Forecasting Officer, FAO Rome and Mr. Mehdi Ghaemian, Locust Information Officer, Tehran for their participation and guidance during the survey in the I.R. Iran.



# **Desert Locust Joint Border Survey in the Spring Breeding Areas of the I.R. Iran and Pakistan**

## **April - May 1999**

### **Introduction**

This is the fifth of the joint surveys recommended by the Nineteenth Session of the Commission for Controlling the Desert Locust in the Eastern Region of its Distribution Area in Southwest Asia in 1994. The survey was undertaken by a joint I.R. Iran / Pakistan team at the time of year when locusts are mostly likely to be present and breeding in both countries.

### **Work Details**

The survey team consisted of four locust experts, two each from Pakistan and I.R. Iran accompanied by a maintenance assistant from each country (Appendix 1).

The Pakistan team crossed the Mirjaveh border point on 1 April 1999 and joined the Iranian team on the same day. The team surveyed the potential breeding areas of I.R. Iran from 1-13 April and entered Pakistan through Taftan border on 18 April 1999. The team then surveyed the potential breeding areas of Baluchistan of Pakistan for 17 days up to 4 May 1999. The Iranian team returned to their country on the next day (Appendix 2).

The team was divided into two groups each consisting of one Pakistani and one Iranian survey officer. One group stopped at a certain distance from the other and made their survey. The first group waited until the second group finished its survey and re-joined them.

Following this procedure, both teams made frequent stops in the potential locust breeding areas and made their observations regarding the locust activity, vegetation, soil type and moisture, extent of rainfall, temperature, and relative humidity. This information was recorded on the FAO Desert Locust Survey and Control Form (Appendix 3).

Throughout the survey, the team stayed in Government Rest Houses in I.R. Iran and Pakistan.

### **Conclusions and Recommendations**

#### **A. Desert Locust**

The survey results indicate that the Desert Locust situation in both countries is calm (Appendix 3).

In view of the very few locusts present and the poor ecological conditions prevailing in spring breeding areas of both countries, there is hardly any possibility of any further locust activity during the current season (Appendices 4-6).

Two important locust breeding areas in I.R. Iran were visited which had not been covered by previous joint surveys. These were the coastal plains along the Hormuz Strait between Jask and Bandar Abbas in Hormozgon Province and a large low-lying area in the interior the straddles Kerman and Sistan-Baluchistan Province, the Jaz Murian Basin (Appendix 8). A third area was also visited north of Jaz Murian in Kerman Province (from Jiroft to Bam to Zahedan) but this was not considered to be an important locust habitat.

## **B. Joint Survey of 2000**

Based on the experiences and results of this year's joint survey, the team recommends the following:

1. It is proposed that the joint survey is undertaken again next year.
2. The experts participating in the survey must be experienced and well informed of the survey procedures
3. The drivers must be familiar with driving in the desert areas and in off-road conditions.
4. To make optimal use of modern equipment and technology used in Desert Locust survey, it is suggested that FAO consider providing an expert from Rome to accompany the survey team in the next year. This will help the survey team to be familiar with the latest development in the survey and control work in the Region.
5. A 30-day itinerary for the survey in 2000, taking into consideration the points raised in this section, is proposed in Appendix 7.

Furthermore, the following may be considered for improving future joint surveys:

1. Locust officers who participate in the joint survey should have a common language. At least one of these officers from each country, preferably the team leader, should have at least a basic understanding and ability to read, write and converse in two languages (English, Farsi or Urdu). English is emphasized because of the language of the survey forms and the final report.
2. In order to insure continuity in survey methodology and to be able to compare the current situation with that seen on past joint surveys, it is suggested that one officer from each country should have participated in a previous joint survey.
3. The SW Asia Executive Committee may want to consider the suggestion of having three locust officers from each country rather than two officers and one maintenance assistant. In the case of I.R. Iran, this would allow for one of the participating locust officers to be from Tehran which could be a means of overcoming the language difficulties. The financial implications of this proposal are minor.
4. Future joint surveys should start on or about 15 April so as not to conflict with the Iranian New Year (Noh Ruz) holiday period.
5. More attention should be given to the potential breeding areas of Jaz Murian in view of their importance and considering the difficulty of obtaining accurate information on a regular and timely basis during the year from this area.

# **APPENDICES**



## APPENDIX 1. SURVEY PARTICIPANTS

### Pakistan

CH. MUHAMMAD SADIQ (team leader)	Entomologist, PPD, Bahawalpur
S.M. RAZIUR REHMAN	Entomologist , PPD, Mirpurkhas
MUHAMMAD AMIN	Maintenance Assistant, PPD, Karachi
ABDULMAJID	Driver, PPD, Quetta
IMAM BAKHSH	Driver, PPD, Turbat
MUHAMMAD ASLAM	Driver, PPD, Mirpurkhas
MUHAMMAD IBRAHIM	Driver, PPD, Noshki

### I.R. Iran

ISLAM SHAHROKHI (team leader)	Agricultural Officer, Jiroft Agricultural Organization, Jiroft
ABDOL RASHID BALOUCHI	Plant Protection Officer, Sistan and Baluchistan Agricultural Organization, Iranshahr
JALIL RAJABI VAHID	Maintenance Assistant, PPO, Tehran
REZA ROSTAMI SALARI	Driver, Jiroft Agricultural Organization, Jiroft
NOSRATULLAH MIR KAZEHI	Driver, Sistan and Baluchistan Agricultural Organization, Iranshahr
MAJID SHAHBAZI	Driver, PPO, Tehran
AKBAR RAZAGHI KASHANI	Driver, PPO, Tehran

### Other (during I.R. Iran portion only)

KEITH CRESSMAN	Locust Forecasting Officer, FAO, Rome
MEHDI GHAEMIAN	Locust Information Officer, PPO, Tehran



## APPENDIX 2. ITINERARY AND KILOMETER TRAVELLED/SURVEYED

Day	Date	Route	Night halt	Km
1	1-Apr-99	Mirjaveh - Zahedan - Saravan	Saravan	550
2	2-Apr-99	Saravan - Suran - Zabolli - Iranshahr	Iranshahr	510
3	3-Apr-99	Iranshahr - Sardegah - Naigon - Iranshahr	Iranshahr	120
4	4-Apr-99	Iranshahr - Beheshtabad - Nikshahr - Chabahar	Chabahar	562
5	5-Apr-99	Chabahar - Vashnam - Parak - Ramin - Chabahar	Chabahar	166
6	6-Apr-99	Chabahar - Kahir - Bir - Sedich - Jask	Jask	384
7	7-Apr-99	Jask - Sirk - Minab - Bandareabbas	Bandareabbas	364
8	8-Apr-99	Bandareabbas - Kahnouj	Kahnouj	217
9	9-Apr-99	Kahnouj - Sulan desert - Jiroft	Jiroft	514
10	10-Apr-99	Jiroft - Zehkalut - Jaz murian - Jiroft	Jiroft	415
11	11-Apr-99	Jiroft - Bam	Bam	122
12	12-Apr-99	Bam - Rahman Abad Regan - Bam	Bam	200
13	13-Apr-99	Bam - Zahedan	Zahedan	325
14	14-Apr-99	-	Zahedan	-
15	15-Apr-99	-	Zahedan	-
16	16-Apr-99	-	Zahedan	-
17	17-Apr-99	-	Zahedan	-
18	18-Apr-99	Zahedan - Mirjaveh	-	85
<b>TOTAL I.R. IRAN</b>				<b>4534</b>
18	18-Apr-99	Mirjaveh - border - Dalbandin	Dalbandin	313
1	19-Apr-99	Dalbandin - Nushki	Nushki	210
2	20-Apr-99	Nushki - Kharan	Kharan	142
3	21-Apr-99	Kharan - Naro - Borko - Kharan	Kharan	268
4	22-Apr-99	Kharan - Basima - Panjgur	Panjgur	336
5	23-Apr-99	Panjgur - Parome area - Panjgur	Panjgur	90
6	24-Apr-99	Panjgur - Turbat	Turbat	277
7	25-Apr-99	Turbat - Sulaika - Turbat	Turbat	102
8	26-Apr-99	Turbat - Pasni - Gorani Cah - Pasni	Pasni	197
9	27-Apr-99	Pasni - Rome - Pasni	Pasni	116
10	28-Apr-99	Pasni - Gowadar	Gowadar	196
11	29-Apr-99	Gowadar - Suntsar - Turbat	Turbat	259
12	30-Apr-99	Turbat - Panjgur	Panjgur	280
13	1-May-99	Panjgur - Basima	Basima	228
14	2-May-99	Basima - Quetta	Quetta	300
15	3-May-99	Quetta - Noshki	Noshki	150
16	4-May-99	Noshki - Taftan	Taftan	525
17	5-May-99	Iranian team entered I.R.Iran at Mirjaveh	-	-
<b>TOTAL PAKISTAN</b>				<b>3989</b>
<b>SURVEY TOTAL</b>				<b>8523</b>





### APPENDIX 3. DESERT LOCUST SURVEY RESULTS

( indicate appropriate information as required )

1	SURVEY STOP	1	2	3	4	5	6
1-1	date	2.4.99	2.4.99	2.4.99	2.4.99	2.4.99	2.4.99
1-2	name	Shandan Valley	Shandan Valley	Hoteoman	Hoteoman	Rud-E Mashkid	Ghadetabad
1-3	latitude (N)	272301	272324	270850	270803	270821	270831
1-4	longitude (E or W)	615425	615501	614835	614871	613417	613348
2	<b>ECOLOGY</b>						
2-1	area (ha) of survey		500		40		
2-2	habitat (wadi, plains, dunes, crops)	sandy dunes	plains	wadi	wadi	wadi	wadi
2-3	date of last rain	6.3.99	6.3.99	6.3.99	6.3.99	6.3.99	6.3.99
2-4	rain amount (mm, Low Moderate High, ?)	L	L	L	L	L	L
2-5	vegetation (dry, greening, green, drying)	greening	greening	greening	greening	drying	drying
2-6	vegetation density (Low Medium Dense)	M	M	M	M	M	M
2-7	soil moisture (wet/dry)	D	D	D	D	D	D
3	<b>LOCUSTS</b>						
3-1	present or absent	A	A	A	A	A	A
3-2	area infested (ha)						
4	<b>HOPPERS</b>						
4-1	hopper stages (H123456F)	H 1 2 3 4 5 6 F	H 1 2 3 4 5 6 F	H 1 2 3 4 5 6 F	H 1 2 3 4 5 6 F	H 1 2 3 4 5 6 F	H 1 2 3 4 5 6 F
4-2	appearance (solitary, transiens, gregarious)	S T G	S T G	S T G	S T G	S T G	S T G
4-3	behaviour (isolated, scattered, groups)	I S G	I S G	I S G	I S G	I S G	I S G
4-4	hopper density (/site, /m2, Low Med High)						
5	<b>BANDS</b>						
5-1	band stage (H12345F)	H 1 2 3 4 5 F	H 1 2 3 4 5 F	H 1 2 3 4 5 F	H 1 2 3 4 5 F	H 1 2 3 4 5 F	H 1 2 3 4 5 F
5-2	band density (/m2 or Low Medium High)						
5-3	band sizes (m2 or ha)						
5-4	number of bands						
6	<b>ADULTS</b>						
6-1	maturity (immature, mature)	I M	I M	I M	I M	I M	I M
6-2	appearance (solitary, transiens, gregarious)	S T G	S T G	S T G	S T G	S T G	S T G
6-3	behaviour (isolated, scattered, groups)	I S G	I S G	I S G	I S G	I S G	I S G
6-4	adult density (/transect, /ha, L M H)						
6-5	breeding (copulating, laying)	C L	C L	C L	C L	C L	C L
7	<b>SWARMS</b>						
7-1	maturity (immature, mature)	I M	I M	I M	I M	I M	I M
7-2	swarm density (/m2 or Low Medium High)						
7-3	swarm size (km2 or ha)						
7-4	number of swarms						
7-5	breeding (copulating, laying)	C L	C L	C L	C L	C L	C L
7-6	flying (direction, time passing)						
7-7	flying height (Low Medium High)	L M H	L M H	L M H	L M H	L M H	L M H
8	<b>CONTROL</b>						
8-1	pesticide name & formulation						
8-2	application rate (l/ha or kg/ha)						
8-3	quantity (l)						
8-4	area treated (ha)						
8-5	ground or air	G A	G A	G A	G A	G A	G A
8-6	estimated % kill						
9	<b>COMMENTS</b>						
	ROUTE: Saravan - (greening) - Suran - (dry) - Zaboli - (dry) - R. Kenaru - (dry) - Iranshahr	small annuals + thin grass are sprouting but will become dry as temps increase and if no more rains		mostly dry with a few thin sprouting annuals		habitat along main river west side of Kuh-E Birg range  strong W wind at 12Z	

kc 99.05

Was a GPS used to determine locations? yes

Is a brief interpretation or analysis of the results included? yes no

Country: IRAN

Locust Officer : 1999 Joint Iran / Pakistan survey (Cressman)

date : 2.4.99

cleared by : \_\_\_\_\_

date : \_\_\_\_\_

( indicate appropriate information as required )

1	SURVEY STOP	1	2	3	4	5	6
1-1	date	3.4.99	3.4.99	3.4.99	3.4.99	3.4.99	3.4.99
1-2	name	Bampur area	Sardighal	Shamsabad	Kourehmemari	Naigun	
1-3	latitude (N)	271259	271411	271326	270644	270626	270736
1-4	longitude (E or W)	602744	602440	602116	604058	604237	6044338
2	<b>ECOLOGY</b>						
2-1	area (ha) of survey	100					
2-2	habitat (wadi, plains, dunes, crops)	dunes	dunes	dunes	dunes	dunes	dunes
2-3	date of last rain	5.3.99	5.3.99	5.3.99	5.3.99	5.3.99	5.3.99
2-4	rain amount (mm. Low Moderate High, ?)	L	L	L	L	L	L
2-5	vegetation (dry, greening, green, drying)	drying	dry	dry	drying	dry	dry
2-6	vegetation density (Low Medium Dense)	L	L	L	L	L	L
2-7	soil moisture (wet/dry)	D	D	D	D	D	D
3	<b>LOCUSTS</b>						
3-1	present or absent	A	A	A	A	A	A
3-2	area infested (ha)						
4	<b>HOPPERS</b>						
4-1	hopper stages (H123456F)	H 1 2 3 4 5 6 F	H 1 2 3 4 5 6 F	H 1 2 3 4 5 6 F	H 1 2 3 4 5 6 F	H 1 2 3 4 5 6 F	H 1 2 3 4 5 6 F
4-2	appearance (solitary, transiens, gregarious)	S T G	S T G	S T G	S T G	S T G	S T G
4-3	behaviour (isolated, scattered, groups)	I S G	I S G	I S G	I S G	I S G	I S G
4-4	hopper density (/site, /m2, Low Med High)						
5	<b>BANDS</b>						
5-1	band stage (H12345F)	H 1 2 3 4 5 F	H 1 2 3 4 5 F	H 1 2 3 4 5 F	H 1 2 3 4 5 F	H 1 2 3 4 5 F	H 1 2 3 4 5 F
5-2	band density (/m2 or Low Medium High)						
5-3	band sizes (m2 or ha)						
5-4	number of bands						
6	<b>ADULTS</b>						
6-1	maturity (immature, mature)	I M	I M	I M	I M	I M	I M
6-2	appearance (solitary, transiens, gregarious)	S T G	S T G	S T G	S T G	S T G	S T G
6-3	behaviour (isolated, scattered, groups)	I S G	I S G	I S G	I S G	I S G	I S G
6-4	adult density (/transect, /ha, L M H)						
6-5	breeding (copulating, laying)	C L	C L	C L	C L	C L	C L
7	<b>SWARMS</b>						
7-1	maturity (immature, mature)	I M	I M	I M	I M	I M	I M
7-2	swarm density (/m2 or Low Medium High)						
7-3	swarm size (km2 or ha)						
7-4	number of swarms						
7-5	breeding (copulating, laying)	C L	C L	C L	C L	C L	C L
7-6	flying (direction, time passing)						
7-7	flying height (Low Medium High)	L M H	L M H	L M H	L M H	L M H	L M H
8	<b>CONTROL</b>						
8-1	pesticide name & formulation						
8-2	application rate (l/ha or kg/ha)						
8-3	quantity (l)						
8-4	area treated (ha)						
8-5	ground or air	G A	G A	G A	G A	G A	G A
8-6	estimated % kill						
9	<b>COMMENTS</b>						
	ROUTE: Iranshahr - (dry) - Sardighal - (drying) - dunes south of Iranshahr - (dry) - Iranshahr	some small annuals sprouting in interdunal areas; total area = 4000 ha  T=33C RH=34%	area dry between stops; controlled L35 transiens that were grouping at dunal bases 5/98	low density annual grass sprouting but now drying in absence of recent rains; local nomad says NO locusts	small annuals drying  T=37 RH=30%		

kc 99.03

Was a GPS used to determine locations? yes

Is a brief interpretation or analysis of the results included? yes no

Country: IRAN

Locust Officer : 1999 Joint Iran / Pakistan survey (Cressman)

date : \_\_\_\_\_

cleared by : \_\_\_\_\_

date : \_\_\_\_\_

( indicate appropriate information as required )

1	SURVEY STOP	1	2	3	4	5	6
1-1	date	4.4.99	4.4.99	4.4.99	4.4.99	5.4.99	5.4.99
1-2	name	Beheshiabad	Beheshiabad	Ali Khan	Ali Khan	Vashnum	Vashnum
1-3	latitude (N)	270906	270849	270720	270719	252350	252323
1-4	longitude (E or W)	601142	601030	600201	600025	604617	604610
2	<b>ECOLOGY</b>						
2-1	area (ha) of survey	100	200	100	120	100	100
2-2	habitat (wadi, plains, dunes, crops)	dunes	dunes	dunes	dunes	plaaains	plains
2-3	date of last rain	6.3.99	6.3.99	6.3.99	6.3.99	5.3.99	5.3.99
2-4	rain amount (mm, Low Moderate High, ?)	L	L	L	L	L	L
2-5	vegetation (dry, greening, green, drying)	drying	drying	drying	drying	dry	drying
2-6	vegetation density (Low Medium Dense)	L	M	L	L	L	L
2-7	soil moisture (wet/dry)	D	D	D	D	D	D
3	<b>LOCUSTS</b>						
3-1	present or absent	A	A	A	A	A	P
3-2	area infested (ha)						100
4	<b>HOPPERS</b>						
4-1	hopper stages (H123456F)	H 1 2 3 4 5 6 F	H 1 2 3 4 5 6 F	H 1 2 3 4 5 6 F	H 1 2 3 4 5 6 F	H 1 2 3 4 5 6 F	H 1 2 3 4 5 6 F
4-2	appearance (solitary, transiens, gregarious)	S T G	S T G	S T G	S T G	S T G	S T G
4-3	behaviour (isolated, scattered, groups)	I S G	I S G	I S G	I S G	I S G	I S G
4-4	hopper density (/site, /m2, Low Med High)						
5	<b>BANDS</b>						
5-1	band stage (H12345F)	H 1 2 3 4 5 F	H 1 2 3 4 5 F	H 1 2 3 4 5 F	H 1 2 3 4 5 F	H 1 2 3 4 5 F	H 1 2 3 4 5 F
5-2	band density (/m2 or Low Medium High)						
5-3	band sizes (m2 or ha)						
5-4	number of bands						
6	<b>ADULTS</b>						
6-1	maturity (immature, mature)	I M	I M	I M	I M	I M	?
6-2	appearance (solitary, transiens, gregarious)	S T G	S T G	S T G	S T G	S T G	S
6-3	behaviour (isolated, scattered, groups)	I S G	I S G	I S G	I S G	I S G	I
6-4	adult density (/transect, /ha, L M H)						5/ha
6-5	breeding (copulating, laying)	C L	C L	C L	C L	C L	C L
7	<b>SWARMS</b>						
7-1	maturity (immature, mature)	I M	I M	I M	I M	I M	I M
7-2	swarm density (/m2 or Low Medium High)						
7-3	swarm size (km2 or ha)						
7-4	number of swarms						
7-5	breeding (copulating, laying)	C L	C L	C L	C L	C L	C L
7-6	flying (direction, time passing)						
7-7	flying height (Low Medium High)	L M H	L M H	L M H	L M H	L M H	L M H
8	<b>CONTROL</b>						
8-1	pesticide name & formulation						
8-2	application rate (l/ha or kg/ha)						
8-3	quantity (l)						
8-4	area treated (ha)						
8-5	ground or air	G A	G A	G A	G A	G A	G A
8-6	estimated % kill						
9	<b>COMMENTS</b>						
	ROUTE: Iranshahr - (drying) - Espakeh - (mountainous, dry) - Nikshahr - (dry) - Jakigor - (dry) - Chabahar - Vashnum - (dry) - Chabahar	dunes + interdunes; drying veg along dune base but not in centre of interdunes				unusually dry; no wind at 9Z (inversion) some dew on the dry veg and on the soil surface	maybe local GH?
		T=32 RH=40%		T=34 RH=28%			

kc 99.05

Was a GPS used to determine locations? yes

Is a brief interpretation or analysis of the results included? yes no

Country: IRAN

Locust Officer : 1999 Joint Iran / Pakistan survey (Cressman)

date : \_\_\_\_\_

cleared by : \_\_\_\_\_

date : \_\_\_\_\_

( indicate appropriate information as required )

1	SURVEY STOP	1	2	3	4	5	6
1-1	date	5.4.99	5.4.99	5.4.99	5.4.99	5.4.99	
1-2	name	Parak	Parak	----	Ramin	Sham	
1-3	latitude (N)	252759	252849	252841	251619	251127	
1-4	longitude (E or W)	603124	603146	602910	604715	610626	
2	<b>ECOLOGY</b>						
2-1	area (ha) of survey	100	100		150	100	
2-2	habitat (wadi, plains, dunes, crops)	dunes	dunes	plains	dunes	coast	
2-3	date of last rain	5.3.99	5.3.99	5.3.99	5.3.99	5.3.99	
2-4	rain amount (mm. Low Moderate High, ?)	L	L	L	L	L	L M H ?
2-5	vegetation (dry, greening, green, drying)	drying	greening	dry	drying	dry	
2-6	vegetation density (Low Medium Dense)	M	M	L	M	M	L M D
2-7	soil moisture (wet/dry)	D	D	D	D	D	W D
3	<b>LOCUSTS</b>						
3-1	present or absent	A	A	A	A	A	P A
3-2	area infested (ha)						
4	<b>HOPPERS</b>						
4-1	hopper stages (H123456F)	H 1 2 3 4 5 6 F	H 1 2 3 4 5 6 F	H 1 2 3 4 5 6 F	H 1 2 3 4 5 6 F	H 1 2 3 4 5 6 F	H 1 2 3 4 5 6 F
4-2	appearance (solitary, transiens, gregarious)	S T G	S T G	S T G	S T G	S T G	S T G
4-3	behaviour (isolated, scattered, groups)	I S G	I S G	I S G	I S G	I S G	I S G
4-4	hopper density (/site, /m2, Low Med High)						
5	<b>BANDS</b>						
5-1	band stage (H12345F)	H 1 2 3 4 5 F	H 1 2 3 4 5 F	H 1 2 3 4 5 F	H 1 2 3 4 5 F	H 1 2 3 4 5 F	H 1 2 3 4 5 F
5-2	band density (/m2 or Low Medium High)						
5-3	band sizes (m2 or ha)						
5-4	number of bands						
6	<b>ADULTS</b>						
6-1	maturity (immature, mature)	I M	I M	I M	I M	I M	I M
6-2	appearance (solitary, transiens, gregarious)	S T G	S T G	S T G	S T G	S T G	S T G
6-3	behaviour (isolated, scattered, groups)	I S G	I S G	I S G	I S G	I S G	I S G
6-4	adult density (/transect, /ha, L M H)						
6-5	breeding (copulating, laying)	C L	C L	C L	C L	C L	C L
7	<b>SWARMS</b>						
7-1	maturity (immature, mature)	I M	I M	I M	I M	I M	I M
7-2	swarm density (/m2 or Low Medium High)						
7-3	swarm size (km2 or ha)						
7-4	number of swarms						
7-5	breeding (copulating, laying)	C L	C L	C L	C L	C L	C L
7-6	flying (direction, time passing)						
7-7	flying height (Low Medium High)	L M H	L M H	L M H	L M H	L M H	L M H
8	<b>CONTROL</b>						
8-1	pesticide name & formulation						
8-2	application rate (l/ha or kg/ha)						
8-3	quantity (l)						
8-4	area treated (ha)						
8-5	ground or air	G A	G A	G A	G A	G A	G A
8-6	estimated % kill						
9	<b>COMMENTS</b>						
	ROUTE: Chabahar - Ramin - Beris - Negur - Chabahar		slight greening at dune bases in areas of runoff; veg denser away from seashore	plains behind Parak dunes and coastal road, up to the foothills	orange dunes on south side of small valley with vegetation mostly at base	only Zygo-philiium sp. is green	

kc 99.03

Was a GPS used to determine locations? yes

Is a brief interpretation or analysis of the results included? yes no

Country: IRAN

Locust Officer : 1999 Joint Iran / Pakistan survey (Cressman)

date : \_\_\_\_\_

cleared by : \_\_\_\_\_

date : \_\_\_\_\_

( indicate appropriate information as required )

1	SURVEY STOP	1	2	3	4	5	6
1-1	date	6.4.99	6.4.99	6.4.99	6.4.99	6.4.99	6.4.99
1-2	name	Kahir area	Kahir area	Bir area	Bir area	Lukyni	Gozdar
1-3	latitude (N)	253532	253619	252645	252747	252943	253115
1-4	longitude (E or W)	600544	600607	594640	594948	592706	592434
2	<b>ECOLOGY</b>						
2-1	area (ha) of survey		100	140	120	100	100
2-2	habitat (wadi, plains, dunes, crops)	dunes	dunes	dunes	dunes	dunes	dunes
2-3	date of last rain	5.3.99	5.3.99	5.3.99	5.3.99	5.3.99	5.3.99
2-4	rain amount (mm, Low Moderate High, ?)	L	L	L	L	L	L
2-5	vegetation (dry, greening, green, drying)	drying	green	drying	drying	drying	drying
2-6	vegetation density (Low Medium Dense)	L	M	M	M	M	M
2-7	soil moisture (wet/dry)	D	D	D	D	D	D
3	<b>LOCUSTS</b>						
3-1	present or absent	A	A	P	A	A	A
3-2	area infested (ha)			25			
4	<b>HOPPERS</b>						
4-1	hopper stages (H123456F)	H 1 2 3 4 5 6 F	H 1 2 3 4 5 6 F	H 1 2 3 4 5 6 F	H 1 2 3 4 5 6 F	H 1 2 3 4 5 6 F	H 1 2 3 4 5 6 F
4-2	appearance (solitary, transiens, gregarious)	S T G	S T G	S T G	S T G	S T G	S T G
4-3	behaviour (isolated, scattered, groups)	I S G	I S G	I S G	I S G	I S G	I S G
4-4	hopper density (/site, /m2, Low Med High)						
5	<b>BANDS</b>						
5-1	band stage (H12345F)	H 1 2 3 4 5 F	H 1 2 3 4 5 F	H 1 2 3 4 5 F	H 1 2 3 4 5 F	H 1 2 3 4 5 F	H 1 2 3 4 5 F
5-2	band density (/m2 or Low Medium High)						
5-3	band sizes (m2 or ha)						
5-4	number of bands						
6	<b>ADULTS</b>						
6-1	maturity (immature, mature)	I M	I M	M	I M	I M	I M
6-2	appearance (solitary, transiens, gregarious)	S T G	S T G	S	S T G	S T G	S T G
6-3	behaviour (isolated, scattered, groups)	I S G	I S G	I	I S G	I S G	I S G
6-4	adult density (/transect, /ha, L M H)			2.5/ha			
6-5	breeding (copulating, laying)	C L	C L	C L	C L	C L	C L
7	<b>SWARMS</b>						
7-1	maturity (immature, mature)	I M	I M	I M	I M	I M	I M
7-2	swarm density (/m2 or Low Medium High)						
7-3	swarm size (km2 or ha)						
7-4	number of swarms						
7-5	breeding (copulating, laying)	C L	C L	C L	C L	C L	C L
7-6	flying (direction, time passing)						
7-7	flying height (Low Medium High)	L M H	L M H	L M H	L M H	L M H	L M H
8	<b>CONTROL</b>						
8-1	pesticide name & formulation						
8-2	application rate (l/ha or kg/ha)						
8-3	quantity (l)						
8-4	area treated (ha)						
8-5	ground or air	G A	G A	G A	G A	G A	G A
8-6	estimated % kill						
9	<b>COMMENTS</b>						
	ROUTE: Chabahar to Jask along coast via Kahir and Zaribad; vegetation becomes drier as move west; dry after Zaribad.	veg starting to dry  no wind at 9Z  behind road at foothills base  T=34 RH=58%		1DL/5x400m 0DL/5x300m 0DL/5x300m  leap frog survey 6km in between  T=34 RH=57%		T=34 RH=68%	

kc 99.05

Was a GPS used to determine locations? yes

Is a brief interpretation or analysis of the results included? yes no

Country: IRAN

Locust Officer : 1999 Joint Iran / Pakistan survey (Cressman)

date : \_\_\_\_\_

cleared by : \_\_\_\_\_

date : \_\_\_\_\_

( indicate appropriate information as required )

1	SURVEY STOP	1	2	3	4	5	6
1-1	date	6.4.99	6.4.99	7.4.99	7.4.99	9.4.99	9.4.99
1-2	name	Roff		N. Goruk area	Sikik	Cha-da-Khuda	Sowlon
1-3	latitude (N)	254400	254327	263831	264015	271659	271246
1-4	longitude (E or W)	583846	584007	570453	570430	581544	583425
2	<b>ECOLOGY</b>						
2-1	area (ha) of survey	50	100	10	120	5	50
2-2	habitat (wadi, plains, dunes, crops)	dunes	dunes	dunes	dunes	plains	dunes
2-3	date of last rain					5.3.99	5.3.99
2-4	rain amount (mm. Low Moderate High, ?)	L M H ?	L M H ?	L M H ?	L M H ?	L	L
2-5	vegetation (dry, greening, green, drying)	dry	drying	drying	drying	drying	drying
2-6	vegetation density (Low Medium Dense)	L	L	M	M	L	L
2-7	soil moisture (wet/dry)	D	D	D	D	D	D
3	<b>LOCUSTS</b>						
3-1	present or absent	A	A	A	A	A	A
3-2	area infested (ha)						
4	<b>HOPPERS</b>						
4-1	hopper stages (H123456F)	H 1 2 3 4 5 6 F	H 1 2 3 4 5 6 F	H 1 2 3 4 5 6 F	H 1 2 3 4 5 6 F	H 1 2 3 4 5 6 F	H 1 2 3 4 5 6 F
4-2	appearance (solitary, transiens, gregarious)	S T G	S T G	S T G	S T G	S T G	S T G
4-3	behaviour (isolated, scattered, groups)	I S G	I S G	I S G	I S G	I S G	I S G
4-4	hopper density (/site, /m2, Low Med High)						
5	<b>BANDS</b>						
5-1	band stage (H12345F)	H 1 2 3 4 5 F	H 1 2 3 4 5 F	H 1 2 3 4 5 F	H 1 2 3 4 5 F	H 1 2 3 4 5 F	H 1 2 3 4 5 F
5-2	band density (/m2 or Low Medium High)						
5-3	band sizes (m2 or ha)						
5-4	number of bands						
6	<b>ADULTS</b>						
6-1	maturity (immature, mature)	I M	I M	I M	I M	I M	I M
6-2	appearance (solitary, transiens, gregarious)	S T G	S T G	S T G	S T G	S T G	S T G
6-3	behaviour (isolated, scattered, groups)	I S G	I S G	I S G	I S G	I S G	I S G
6-4	adult density (/transect, /ha, L M H)						
6-5	breeding (copulating, laying)	C L	C L	C L	C L	C L	C L
7	<b>SWARMS</b>						
7-1	maturity (immature, mature)	I M	I M	I M	I M	I M	I M
7-2	swarm density (/m2 or Low Medium High)						
7-3	swarm size (km2 or ha)						
7-4	number of swarms						
7-5	breeding (copulating, laying)	C L	C L	C L	C L	C L	C L
7-6	flying (direction, time passing)						
7-7	flying height (Low Medium High)	L M H	L M H	L M H	L M H	L M H	L M H
8	<b>CONTROL</b>						
8-1	pesticide name & formulation						
8-2	application rate (l/ha or kg/ha)						
8-3	quantity (l)						
8-4	area treated (ha)						
8-5	ground or air	G A	G A	G A	G A	G A	G A
8-6	estimated % kill						
9	<b>COMMENTS</b>						
	ROUTE: Jask - (dry) - Minab - (dry) - Bandar Abbas - (dry) - Kehnoj - (drying) - Qal-eh Ganj - (drying) - Sowlon	very strong W wind at 17Z  T=37 RH=52%  (sunset at 1845Z)		T=35 RH=54% (10Z)  1st set of dunes off Jask-Minab road north of Jask		breakfast; new Ag Office under construction; dry grasses along plains from Qal-eh Ganj have ended and dunes yet to start  strong S at 12Z	area where dune belt to Iranshahr & Remeshk starts on edge of Jaz Murian; one L24 band treated 5/98 on 20 ha; met local scout  T=37 RH=35%

kc 99.03

Was a GPS used to determine locations? yes

Is a brief interpretation or analysis of the results included? yes no

Country: IRAN

Locust Officer : 1999 Joint Iran / Pakistan survey (Cressman)

date : \_\_\_\_\_

cleared by : \_\_\_\_\_

date : \_\_\_\_\_

( indicate appropriate information as required )

1	SURVEY STOP	1	2	3	4	5	6
1-1	date	9.4.99	10.4.99	10.4.99	12.4.99	12.4.99	12.4.99
1-2	name	Ziarat	Jaz Murian	Eshlan	Dashti Ameri	Dashti Ameri	Rastam A. Rigan
1-3	latitude (N)	271157	272828	273429	284358	284345	283617
1-4	longitude (E or W)	583249	583403	583238	585530	585603	590644
2	<b>ECOLOGY</b>						
2-1	area (ha) of survey	50	500	50	100	120	100
2-2	habitat (wadi, plains, dunes, crops)	dunes	dunes	dunes	plains/dunes	plains/dunes	plains/dunes
2-3	date of last rain	5.3.99			17.3.99	17.3.99	17.3.99
2-4	rain amount (mm, Low Moderate High, ?)	L	L M H ?	L M H ?	L	L	L
2-5	vegetation (dry, greening, green, drying)	drying	drying	drying	drying	drying	drying
2-6	vegetation density (Low Medium Dense)	L	M	M	L	L	L
2-7	soil moisture (wet/dry)	D	D	D	D	D	D
3	<b>LOCUSTS</b>						
3-1	present or absent	A	A	A	A	A	A
3-2	area infested (ha)						
4	<b>HOPPERS</b>						
4-1	hopper stages (H123456F)	H 1 2 3 4 5 6 F	H 1 2 3 4 5 6 F	H 1 2 3 4 5 6 F	H 1 2 3 4 5 6 F	H 1 2 3 4 5 6 F	H 1 2 3 4 5 6 F
4-2	appearance (solitary, transiens, gregarious)	S T G	S T G	S T G	S T G	S T G	S T G
4-3	behaviour (isolated, scattered, groups)	I S G	I S G	I S G	I S G	I S G	I S G
4-4	hopper density (/site, /m2, Low Med High)						
5	<b>BANDS</b>						
5-1	band stage (H12345F)	H 1 2 3 4 5 F	H 1 2 3 4 5 F	H 1 2 3 4 5 F	H 1 2 3 4 5 F	H 1 2 3 4 5 F	H 1 2 3 4 5 F
5-2	band density (/m2 or Low Medium High)						
5-3	band sizes (m2 or ha)						
5-4	number of bands						
6	<b>ADULTS</b>						
6-1	maturity (immature, mature)	I M	I M	I M	I M	I M	I M
6-2	appearance (solitary, transiens, gregarious)	S T G	S T G	S T G	S T G	S T G	S T G
6-3	behaviour (isolated, scattered, groups)	I S G	I S G	I S G	I S G	I S G	I S G
6-4	adult density (/transect, /ha, L M H)						
6-5	breeding (copulating, laying)	C L	C L	C L	C L	C L	C L
7	<b>SWARMS</b>						
7-1	maturity (immature, mature)	I M	I M	I M	I M	I M	I M
7-2	swarm density (/m2 or Low Medium High)						
7-3	swarm size (km2 or ha)						
7-4	number of swarms						
7-5	breeding (copulating, laying)	C L	C L	C L	C L	C L	C L
7-6	flying (direction, time passing)						
7-7	flying height (Low Medium High)	L M H	L M H	L M H	L M H	L M H	L M H
8	<b>CONTROL</b>						
8-1	pesticide name & formulation						
8-2	application rate (l/ha or kg/ha)						
8-3	quantity (l)						
8-4	area treated (ha)						
8-5	ground or air	G A	G A	G A	G A	G A	G A
8-6	estimated % kill						
9	<b>COMMENTS</b>						
	ROUTE: Sowlon - Qal-eh Ganj - Kehnoj - Jiroft - Zeh Kalat - w. Jaz Murian pan - return to Jiroft; Bam to southeast (dry) - Bam.	dune set furthest west in southern Jaz Murian; from highest dune can see thin line of green veg on horizon (centre of Jaz Murian); 11Z; NNW wind T=38 RH=22%	clay plains in centre of Jaz Murian basin; area of drying grass; 5/98 L24 hopper + adult control; very strong W wind; T=32 RH=50%	north edge of 5 km grassy area near pan; control 5/98; T=35 RH=19	cold N wind; No DL ever seen here before; low dunes on gravel plains T=21 RH=25%	leap frog = 3.3km	T=23 RH=45%

kc 99/03

Was a GPS used to determine locations? yes

Is a brief interpretation or analysis of the results included? yes no

Country: IRAN

Locust Officer : 1999 Joint Iran / Pakistan survey (Cressman)

date : \_\_\_\_\_

cleared by : \_\_\_\_\_

date : \_\_\_\_\_

<b>SURVEY STOP</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>1</b>							
1-1	date	19/04/99	19/04/99	19/04/99	20/04/99	20/04/99	20/04/99
1-2	name	Yakmach	Peshar area	Padag	Bhopo Rag	Bhopo Rag	Bhopo Rag
1-3	latitude (N)	284731	285612	285898	283416	283407	283469
1-4	longitude (E or W)	640276	643791	650477	651992	651881	651678
<b>2</b>	<b>ECOLOGY</b>						
2-1	area (ha) of survey	25	25	25	25	25	25
2-2	habitat (wadi plains dunes crops)	dunes	sandy plains	sandy plains	dunes	sandy plains	dunes
2-3	date of last rain	06/03/99	06/03/99	06/03/99	06/03/99	06/03/99	06/03/99
2-4	rain amount (mm or Low Moderate High)	L	L	L	L	L	L
2-5	vegetation (dry greening green drying)	drying	drying	drying	drying	drying	drying
2-6	vegetation density (Low Medium Dense)	L	L	M	L	L	L
2-7	soil moisture (wet dry)	D	D	D	D	D	D
<b>3</b>	<b>LOCUSTS</b>						
3-1	present or absent	A	A	A	A	A	A
3-2	area infested (ha)						
<b>4</b>	<b>HOPPERS</b>						
4-1	hopper stages (H123456F)						
4-2	appearance (solitary, transiens, gregarious)						
4-3	behaviour (isolated, scattered, groups)						
4-4	hopper density (/site or /sqm)						
<b>5</b>	<b>BANDS</b>						
5-1	band stage (H 1 2 3 4 5 F)						
5-2	band density (/sqm or Low Medium High)						
5-3	band sizes (m2 or ha)						
5-4	number of bands						
<b>6</b>	<b>ADULTS</b>						
6-1	maturity (immature, mature)						
6-2	appearance (solitary, transiens, gregarious)						
6-3	behaviour (isolated, scattered, groups)						
6-4	adult density (/transect or /ha)						
6-5	breeding (copulating, laying)						
<b>7</b>	<b>SWARMS</b>						
7-1	maturity (immature, mature)						
7-2	swarm density (/sqm or Low Medium High)						
7-3	swarm size (km2 or ha)						
7-4	number of swarms						
7-5	breeding (copulating, laying)						
7-6	flying (direction, time passing)						
7-7	flying height (Low Medium High)						
<b>8</b>	<b>CONTROL</b>						
8-1	pesticide name & formulation						
8-2	application rate (l/ha or kg/ha)						
8-3	quantity (l)						
8-4	area treated (ha)						
8-5	ground or air						
8-6	estimated % kill						
<b>9</b>	<b>COMMENTS</b>						
		D.T.=35 W.T.=22 R.H.=30%	D.T.=36 W.T.=23 R.H.=32%	D.T.=37 W.T.=18 R.H.=13%	D.T.=38 W.T.=15 R.H.>10%	D.T.=33.5 W.T.=16 R.H.=13%	D.T.=33 W.T.=17.5 R.H.=16%

Was a GPS used to determine locations? **Yes** Is a brief interpretation or analysis of the results included?

Country: **Pakistan**

Locust Officer: **Pakistan & Iran Joint Locust Survey Team** date:

cleared by:

date:



<b>SURVEY STOP</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>1</b>							
1-1	date	21/04/99	21/04/99	21/04/99	21/04/99	22/04/99	22/04/99
1-2	name	Yelli Stream	Kamrani	Naru	Borko area	Koragni	Nag
1-3	latitude (N)	281926	282011	282195	281271	275825	272584
1-4	longitude (E or W)	653424	653144	652907	651704	654779	650266
<b>2</b>	<b>ECOLOGY</b>						
2-1	area (ha) of survey	10	10	10	10	10	10
2-2	habitat (wadi plains dunes crops)	sandy plains	dunes	dunes	dunes	plain	plain
2-3	date of last rain	06/03/99	06/03/99	06/03/99	06/03/99	06/03/99	06/03/99
2-4	rain amount (mm or Low Moderate High)	L	L	L	L	L	L
2-5	vegetation (dry greening green drying)	drying	green	drying	drying	drying	?
2-6	vegetation density (Low Medium Dense)	L	M	M	L	L	L
2-7	soil moisture (wet dry)	D	W	D	D	D	D
<b>3</b>	<b>LOCUSTS</b>						
3-1	present or absent	P	A	A	A	A	A
3-2	area infested (ha)						
<b>4</b>	<b>HOPPERS</b>						
4-1	hopper stages (H123456F)						
4-2	appearance (solitary, transiens, gregarious)						
4-3	behaviour (isolated, scattered, groups)						
4-4	hopper density (/site or /sqm)						
<b>5</b>	<b>BANDS</b>						
5-1	band stage (H 1 2 3 4 5 F)						
5-2	band density (/sqm or Low Medium High)						
5-3	band sizes (m2 or ha)						
5-4	number of bands						
<b>6</b>	<b>ADULTS</b>						
6-1	maturity (immature, mature)	M					
6-2	appearance (solitary, transiens, gregarious)	S					
6-3	behaviour (isolated, scattered, groups)	I					
6-4	adult density (/transect or /ha)	2.5/ha					
6-5	breeding (copulating, laying)						
<b>7</b>	<b>SWARMS</b>						
7-1	maturity (immature, mature)						
7-2	swarm density (/sqm or Low Medium High)						
7-3	swarm size (km2 or ha)						
7-4	number of swarms						
7-5	breeding (copulating, laying)						
7-6	flying (direction, time passing)						
7-7	flying height (Low Medium High)						
<b>8</b>	<b>CONTROL</b>						
8-1	pesticide name & formulation						
8-2	application rate (l/ha or kg/ha)						
8-3	quantity (l)						
8-4	area treated (ha)						
8-5	ground or air						
8-6	estimated % kill						
<b>9</b>	<b>COMMENTS</b>						
		D.T.=32.5 W.T.=16.5 R.H.=16%	D.T.=32 W.T.=15 R.H.=12%	D.T.=34 W.T.=16.5 R.H.=14%	D.T.=35.5 W.T.=17.5 R.H.=14%		

Was a GPS used to determine locations? **Yes** Is a brief interpretation or analysis of the results included?

Country: **Pakistan**

Locust Officer: **Pakistan & Iran Joint Locust Survey Team** date:

cleared by:

date:

<b>SURVEY STOP</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>1</b>							
1-1	date	23/04/99	23/04/99	23/04/99	23/04/99	23/04/99	25/04/99
1-2	name	Kalak	Kalak	Saryan	Koben	Chauukal	Sulika
1-3	latitude (N)	265704	265535	265266	265025	265166	255298
1-4	longitude (E or W)	635957	635573	635326	635335	635695	624385
<b>2</b>	<b>ECOLOGY</b>						
2-1	area (ha) of survey	25	25	25	25	25	25
2-2	habitat (wadi plains dunes crops)	plains	plains	sandy plains	sandy plains	sandy plains	low dunes
2-3	date of last rain	06/03/99	06/03/99	06/03/99	06/03/99	06/03/99	06/03/99
2-4	rain amount (mm or Low Moderate High)	L	L	L	L	L	M
2-5	vegetation (dry greening green drying)	drying	drying	drying	drying	drying	drying
2-6	vegetation density (Low Medium Dense)	M	M	L	L	L	M
2-7	soil moisture (wet dry)	?	?	?	?	?	D
<b>3</b>	<b>LOCUSTS</b>						
3-1	present or absent	A	A	P	A	A	A
3-2	area infested (ha)						
<b>4</b>	<b>HOPPERS</b>						
4-1	hopper stages (H123456F)						
4-2	appearance (solitary, transiens, gregarious)						
4-3	behaviour (isolated, scattered, groups)						
4-4	hopper density (/site or /sqm)						
<b>5</b>	<b>BANDS</b>						
5-1	band stage (H 1 2 3 4 5 F)						
5-2	band density (/sqm or Low Medium High)						
5-3	band sizes (m2 or ha)						
5-4	number of bands						
<b>6</b>	<b>ADULTS</b>						
6-1	maturity (immature, mature)			M			
6-2	appearance (solitary, transiens, gregarious)			S			
6-3	behaviour (isolated, scattered, groups)			I			
6-4	adult density (/transect or /ha)			2.5/ha			
6-5	breeding (copulating, laying)						
<b>7</b>	<b>SWARMS</b>						
7-1	maturity (immature, mature)						
7-2	swarm density (/sqm or Low Medium High)						
7-3	swarm size (km2 or ha)						
7-4	number of swarms						
7-5	breeding (copulating, laying)						
7-6	flying (direction, time passing)						
7-7	flying height (Low Medium High)						
<b>8</b>	<b>CONTROL</b>						
8-1	pesticide name & formulation						
8-2	application rate (l/ha or kg/ha)						
8-3	quantity (l)						
8-4	area treated (ha)						
8-5	ground or air						
8-6	estimated % kill						
<b>9</b>	<b>COMMENTS</b>						
		D.T.=29.5 W.T.=18 R.H.=32%	D.T.=32 W.T.=23.5 R.H.=48%	D.T.=35 W.T.=22 R.H.=32%	D.T.=35 W.T.=24 R.H.=40%	D.T.=38 W.T.=24.5 R.H.=48%	D.T.=35 W.T.=25.5 R.H.=47% locust control in 1990

Was a GPS used to determine locations? **Yes**

Is a brief interpretation or analysis of the results included?

Country: **Pakistan**

Locust Officer: **Pakistan & Iran Joint Locust Survey Team** date:

cleared by:

date:

SURVEY STOP		1	2	3	4	5	6
<b>1</b>							
1-1	date	25/04/99	25/04/99	25/04/99	26/04/99	26/04/99	26/04/99
1-2	name	Sulika (II)	Potwani (I)	Potwani (II)	Gorani Chah (I)	Gorani Chah (II)	Shashani Chall
1-3	latitude (N)	255155	255152	255211	251630	251602	251484
1-4	longitude (E or W)	624328	624405	624409	632107	632012	632185
<b>2</b>	<b>ECOLOGY</b>						
2-1	area (ha) of survey	120	50	25	50	50	25
2-2	habitat (wadi plains dunes crops)	low dunes	sandy dunes	sandy dunes	dunes	low dunes	dunes
2-3	date of last rain	06/03/99	06/03/99	06/03/99	06/03/99	06/03/99	06/03/99
2-4	rain amount (mm or Low Moderate High)	M	M	M	M	M	M
2-5	vegetation (dry greening green drying)	dry	drying	drying	drying	green	green
2-6	vegetation density (Low Medium Dense)	L	M	M	M	?	M
2-7	soil moisture (wet dry)	D	?	D	D	D	D
<b>3</b>	<b>LOCUSTS</b>						
3-1	present or absent	A	A	A	A	A	A
3-2	area infested (ha)						
<b>4</b>	<b>HOPPERS</b>						
4-1	hopper stages (H123456F)						
4-2	appearance (solitary, transiens, gregarious)						
4-3	behaviour (isolated, scattered, groups)						
4-4	hopper density (/site or /sqm)						
<b>5</b>	<b>BANDS</b>						
5-1	band stage (H 1 2 3 4 5 F)						
5-2	band density (/sqm or Low Medium High)						
5-3	band sizes (m2 or ha)						
5-4	number of bands						
<b>6</b>	<b>ADULTS</b>						
6-1	maturity (immature, mature)						
6-2	appearance (solitary, transiens, gregarious)						
6-3	behaviour (isolated, scattered, groups)						
6-4	adult density (/transect or /ha)						
6-5	breeding (copulating, laying)						
<b>7</b>	<b>SWARMS</b>						
7-1	maturity (immature, mature)						
7-2	swarm density (/sqm or Low Medium High)						
7-3	swarm size (km2 or ha)						
7-4	number of swarms						
7-5	breeding (copulating, laying)						
7-6	flying (direction, time passing)						
7-7	flying height (Low Medium High)						
<b>8</b>	<b>CONTROL</b>						
8-1	pesticide name & formulation						
8-2	application rate (l/ha or kg/ha)						
8-3	quantity (l)						
8-4	area treated (ha)						
8-5	ground or air						
8-6	estimated % kill						
<b>9</b>	<b>COMMENTS</b>						
		D.T.=33 W.T.=23 R.H.=42% locust control in	D.T.=35 W.T.=26 R.H.=52% sorghum crop	D.T.=36.5 W.T.=30 R.H.=63%	D.T.=32 W.T.=23.5 R.H.=50%	D.T.=31.5 W.T.=24 R.H.=54%	D.T.=28.5 W.T.=24 R.H.=68%

Was a GPS used to determine locations? **Yes**

Is a brief interpretation or analysis of the results included?

Country: **Pakistan**

Locust Officer: **Pakistan & Iran Joint Locust Survey Team** date:

cleared by:

date:

SURVEY STOP		1	2	3	4	5	6
<b>1</b>							
1-1	date	27/04/99	27/04/99	27/04/99	27/04/99	28/04/99	28/04/99
1-2	name	Shadi Kor	Taluband	Dosi Kaur	Romra	Gano	Kargo
1-3	latitude (N)	252436	252456	252595	252354	252589	252737
1-4	longitude (E or W)	632798	633027	633715	634163	631069	630373
<b>2</b>	<b>ECOLOGY</b>						
2-1	area (ha) of survey	40	40	25	25	25	25
2-2	habitat (wadi plains dunes crops)	dunes	plains	plains	low dunes	sandy plains	sandy plains
2-3	date of last rain	06/03/99	06/03/99	06/03/99	06/03/99	06/03/99	06/03/99
2-4	rain amount (mm or Low Moderate High)	M	M	M	M	M	M
2-5	vegetation (dry greening green drying)	drying	drying	drying	drying	drying	drying
2-6	vegetation density (Low Medium Dense)	L	M	L	M	M	M
2-7	soil moisture (wet dry)	D	D	D	D	D	D
<b>3</b>	<b>LOCUSTS</b>						
3-1	present or absent	A	A	A	A	A	A
3-2	area infested (ha)						
<b>4</b>	<b>HOPPERS</b>						
4-1	hopper stages (H123456F)						
4-2	appearance (solitary, transiens, gregarious)						
4-3	behaviour (isolated, scattered, groups)						
4-4	hopper density (/site or /sqm)						
<b>5</b>	<b>BANDS</b>						
5-1	band stage (H 1 2 3 4 5 F)						
5-2	band density (/sqm or Low Medium High)						
5-3	band sizes (m2 or ha)						
5-4	number of bands						
<b>6</b>	<b>ADULTS</b>						
6-1	maturity (immature, mature)						
6-2	appearance (solitary, transiens, gregarious)						
6-3	behaviour (isolated, scattered, groups)						
6-4	adult density (/transect or /ha)						
6-5	breeding (copulating, laying)						
<b>7</b>	<b>SWARMS</b>						
7-1	maturity (immature, mature)						
7-2	swarm density (/sqm or Low Medium High)						
7-3	swarm size (km2 or ha)						
7-4	number of swarms						
7-5	breeding (copulating, laying)						
7-6	flying (direction, time passing)						
7-7	flying height (Low Medium High)						
<b>8</b>	<b>CONTROL</b>						
8-1	pesticide name & formulation						
8-2	application rate (l/ha or kg/ha)						
8-3	quantity (l)						
8-4	area treated (ha)						
8-5	ground or air						
8-6	estimated % kill						
<b>9</b>	<b>COMMENTS</b>						
		D.T.=37 W.T.=22 R.H.=26%	D.T.=37 W.T.=28 R.H.=26%	D.T.=38 W.T.=20.5 R.H.=19%	D.T.=34.5 W.T.=24.5 R.H.=43%	D.T.=33 W.T.=22 R.H.=38%	D.T.=35.5 W.T.=22 R.H.=31%

Was a GPS used to determine locations? **Yes** Is a brief interpretation or analysis of the results included?

Country: **Pakistan**

Locust Officer: **Pakistan & Iran Joint Locust Survey Team** date:

cleared by:

date:

SURVEY STOP		1	2	3	4	5	6
<b>1</b>							
1-1	date	29/04/99	29/04/99				
1-2	name	Saiji (Suntsar)	Shooli				
1-3	latitude (N)	251452	253506				
1-4	longitude (E or W)	681143	620672				
<b>2</b>	<b>ECOLOGY</b>						
2-1	area (ha) of survey	25	25				
2-2	habitat (wadi plains dunes crops)	plains	low dunes				
2-3	date of last rain	06/03/99	06/03/99				
2-4	rain amount (mm or Low Moderate High)	M	M				
2-5	vegetation (dry greening green drying)	dry	drying				
2-6	vegetation density (Low Medium Dense)	L	M				
2-7	soil moisture (wet dry)	D	D				
<b>3</b>	<b>LOCUSTS</b>						
3-1	present or absent	A	A				
3-2	area infested (ha)						
<b>4</b>	<b>HOPPERS</b>						
4-1	hopper stages (H123456F)						
4-2	appearance (solitary, transiens, gregarious)						
4-3	behaviour (isolated, scattered, groups)						
4-4	hopper density (/site or /sqm)						
<b>5</b>	<b>BANDS</b>						
5-1	band stage (H 1 2 3 4 5 F)						
5-2	band density (/sqm or Low Medium High)						
5-3	band sizes (m2 or ha)						
5-4	number of bands						
<b>6</b>	<b>ADULTS</b>						
6-1	maturity (immature, mature)						
6-2	appearance (solitary, transiens, gregarious)						
6-3	behaviour (isolated, scattered, groups)						
6-4	adult density (/transect or /ha)						
6-5	breeding (copulating, laying)						
<b>7</b>	<b>SWARMS</b>						
7-1	maturity (immature, mature)						
7-2	swarm density (/sqm or Low Medium High)						
7-3	swarm size (km2 or ha)						
7-4	number of swarms						
7-5	breeding (copulating, laying)						
7-6	flying (direction, time passing)						
7-7	flying height (Low Medium High)						
<b>8</b>	<b>CONTROL</b>						
8-1	pesticide name & formulation						
8-2	application rate (l/ha or kg/ha)						
8-3	quantity (l)						
8-4	area treated (ha)						
8-5	ground or air						
8-6	estimated % kill						
<b>9</b>	<b>COMMENTS</b>						
		D.T.=37 W.T.=24 R.H.=34	D.T.=41.5 W.T.=23 R.H.=20%				

Was a GPS used to determine locations? **Yes**

Is a brief interpretation or analysis of the results included?

Country: **Pakistan**

Locust Officer: **Pakistan & Iran Joint Locust Survey Team** date:

cleared by:

date:



#### APPENDIX 4. RAINFALL DATA

1999	Jan.	Feb.	Mar.	Apr.	Total
Saravan	40.6	22.9	25.7	NIL	89.2
Iranshahr	4.9	31.6	24.2	NIL	60.7
Chabahar	1	3.1	42.3	NIL	46.4
Minab	23.7	137.7	45.6	NIL	207
Bandar Abbas	57.4	29.5	10.8	NIL	97.7
Kahnuj	42	67.5	53.6	NIL	163.1
Jiroft	32.2	35	40.9	NIL	108.1
Bam	14.4	9.3	47.7	1	72.4
Noshki	52	85	20	NIL	157
Kharan	18	80	15	NIL	113
Panjgur	NIL	32.1	26.4	NIL	58.5
Turbat	10	34	46	NIL	90
Pasni	2	45	14	NIL	61
Gwadar	16	57	45	NIL	118





**APPENDIX 5. METEOROLOGICAL OBSERVATIONS (I.R. IRAN)**

Date	Hour	Place	Coordinates	Temp	RH%	Wind	Direction
2-Apr-99	07:15	Shandan	272255/615421	14	55	calm	-
2-Apr-99	10:30	?	272851/614838	38	65	calm	westerly
3-Apr-99	08:00	near Bampour	271259/602747	33	34	calm	-
3-Apr-99	09:00	Sardegal	271259/602747	36	50	calm	-
3-Apr-99	11:00	Shams Abad	271327/602110	37	25	calm	-
3-Apr-99	15:00	Koureh Memari	270639/604057	37	30	calm	-
3-Apr-99	16:00	Naigon	270623/604240	37	24	calm	-
3-Apr-99	17:00	Motor Davari	270720/600201	36.5	28	calm	-
4-Apr-99	09:30	Behesht Abad	270905/601138	31.5	28	calm	-
4-Apr-99	10:30	Pich-e-Alikhan	270720/600201	31.5	40	calm	-
5-Apr-99	08:30	Vashnam	252323/604600	32	55	calm	-
5-Apr-99	09:30	Parak	252849/603146	33	52	calm	-
5-Apr-99	10:30	Ramin	251619/604715	29	80	mild	southerly
6-Apr-99	08:30	Kahir	253619/600607	34	58	mild	southerly
6-Apr-99	10:30	Ferof ?	252644/594624	34	68	mild	southerly
7-Apr-99	11:00	Gomkaver ?	263832/570456	35	54	mild	southerly
9-Apr-99	09:00	Sulan	271247/583426	37	35	mild	easterly
9-Apr-99	11:00	Ziarat	271157/583202	38	22	mild	easterly
10-Apr-99	09:30	Jaz Murian	272832/583401	32	50	mild	easterly
10-Apr-99	10:30	?	273429/583238	34.5	19	mild	easterly
12-Apr-99	09:00	Dasht Amri	284345/585602	21	25	mild	easterly
12-Apr-99	10:30	Rahmat Abad Rigan	283624/590645	23.5	45	mild	easterly



**APPENDIX 6. METEOROLOGICAL OBSERVATIONS (PAKISTAN)**

Date	Hour	Place	Coordinates	Temp	RH%	Wind	Direction	Remarks
19-Apr-99	10:30	Yakmach	284731/640276	35	30	mild	westerly	rain on 6-3-99
19-Apr-99	11:30	Peshak	285612/643791	36	32	mild	westerly	rain on 6-3-99
19-Apr-99	12:45	Padag	285898/650477	37	13	mild	westerly	rain on 6-3-99
20-Apr-99	16:30	Bhoro Rag.	283416/651992	35	10	mild	westerly	rain on 6-3-99
21-Apr-99	08:30	Yelli Stream	281926/653424	32	16	mild	westerly	rain on 6-3-99
21-Apr-99	10:00	Kamrani	282011/653144	32	12	mild	westerly	rain on 6-3-99
21-Apr-99	10:35	Naro	281271/651704	35.5	14	mild	westerly	rain on 6-3-99
23-Apr-99	07:30	Kalak	265704/635957	29.5	32	mild	westerly	rain on 6-3-99
23-Apr-99	08:15	Sarvan	265266/635326	35	32	mild	westerly	rain on 6-3-99
23-Apr-99	09:00	Koben	265025/635335	35	40	mild	westerly	rain on 6-3-99
23-Apr-99	11:0	Chaukal	265166/635695	38	45	mild	westerly	rain on 6-3-99
25-Apr-99	07:15	Sulika	255298/624385	35	47	calm	-	rain on 6-3-99
25-Apr-99	08:45	Potwani	255152/624405	35	52	calm	-	rain on 6-3-99
26-Apr-99	17:00	Gorani Chah	251630/632107	32	52	mild	southerly	rain on 6-3-99
26-Apr-99	17:30	Shaghani Chah	251497/632036	29.5	64	mild	southerly	rain on 6-3-99
27-Apr-99	07:15	Shadikor	252436/632798	37	26	mild	southerly	rain on 6-3-99
27-Apr-99	08:30	Taluband	252456/633027	37	26	mild	southerly	rain on 6-3-99
27-Apr-99	11:00	Romra	252354/634163	34.5	43	mild	southerly	rain on 6-3-99
28-Apr-99	08:30	Gano	252889/631069	33	38	mild	southerly	rain on 6-3-99
29-Apr-99	10:30	Saiji	251452/681143	37	34	calm	-	rain on 6-3-99
29-Apr-99	11:45	Shooli	253506/620672	41.5	20	calm	-	rain on 6-3-99

*NB. coordinates are in decimal minutes*



## APPENDIX 7. ITINERARY FOR 2000

Day	Date	Route	Night halt
1	15-Apr-2000	Pakistan team cross into Iran at Mirjaveh	Saravan
2	16-Apr-2000	Saravan - Zaboli - Iranshahr	Iranshahr
3	17-Apr-2000	Iranshahr - Chabahar	Chabahar
4	18-Apr-2000	Chabahar - Gwater - Dashtiari	Chabahar
5	19-Apr-2000	Chabahar (Vashnam)	Chabahar
6	20-Apr-2000	Chabahar - Zarabad	Zarabad
7	21-Apr-2000	Zarabad - Jask	Jask
8	22-Apr-2000	Jask - Kahnuj	Kahnuj
9	23-Apr-2000	Kahnuj - Solan - Kahnuj	Kahnuj
10	24-Apr-2000	Kahnuj - Dalgan	Dalgan
11	25-Apr-2000	Dalgan - Espakeh - Iranshahr	Iranshahr
12	26-Apr-2000	Bampour area	Iranshahr
13	27-Apr-2000	Iranshahr - Zahedan	Zahedan
1	28-Apr-2000	Cross into Pakistan at Mirjaveh	Dalbandin
2	29-Apr-2000	Dalbandin – Nushki	Nushki
3	30-Apr-2000	Nushki – Kharan	Kharan
4	01-May-2000	Kharan (Borko and Naroo area)	Kharan
5	02-May-2000	Kharan – Panjgur	Panjgur
6	03-May-2000	Panjgur (Parome area)	Panjgur
7	04-May-2000	Panjgur – Turbat	Turbat
8	05-May-2000	Turbat (Sulaika area)	Turbat
9	06-May-2000	Turbat – Pasni	Pasni
10	07-May-2000	Pasni area	Pasni
11	08-May-2000	Pasni – Gwadar	Gwadar
12	09-May-2000	Gwadar – Turbat via Suntsar	Turbat
13	10-May-2000	Turbat – Panjgur	Panjgur
14	11-May-2000	Panjgur – Quetta	Quetta
15	12-May-2000	Halt in Quetta	Quetta
16	13-May-2000	Quetta – Dalbandin	Dalbandin
17	14-May-2000	Dalbandin – Taftan	Taftan
	15-May-2000	Iran team crosses into Iran at Taftan	-

*NB. the proposed start date for survey of 15 April takes into consideration Iranian New Year holidays; the proposed route includes extra time in Jaz Murian.*



## APPENDIX 8. SURVEY PHOTOS

Several new areas in I.R. Iran were visited that were not covered in previous joint surveys. These were the coastal plains in Hormozgon Province between Jask and Bandar Abbas and the Jaz Murian Basin in the interior of Kerman Province.



1. Green vegetation on dunes in the Goruk area (263831N/570453E) with the Strait of Hormuz in the background (7 Apr).



2. Goruk area (263831N/570453E) looking inland (9 Apr).



3. Dune area at Ziarat (271157N/583249E) on the southern side of the Jaz Murian Basin (9 Apr).



4. Low green vegetation on the flat central pan of the Jaz Murian Basin (272828N/583403E).



5. In the centre of the Jaz Murian Basin (272828N/583403E) on 9 Apr.



6. Green bushes in the Jaz Murian Basin (273429N/583238E) on 9 Apr.