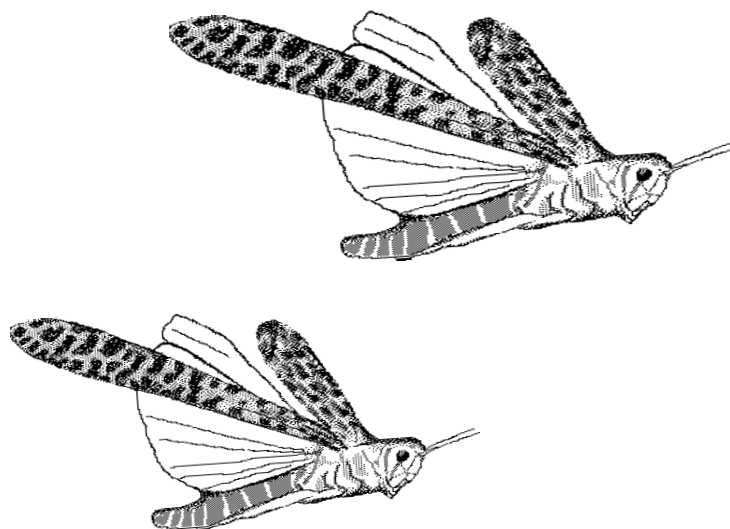


Desert Locust Joint Survey in the Spring Breeding Areas of the I.R. Iran and Pakistan

April 2007



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

April 2007

**A. Rashidi Moghadam
Muhammad Ramazan
N. Mirlashari
Lal Khan
M. Boroumand**

**FOOD AND AGRICULTURE ORGANIZATION
OF THE UNITED NATIONS**

June 2007

The designations employed and the presentation of material in this information product 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 or development status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

The Food and Agriculture Organization of the United Nations encourages the dissemination of material contained in this publication, provided that reference is made to the source.

All rights reserved. Reproduction and dissemination of material in this information product for educational or other non-commercial purposes are authorized without any prior written permission from the copyright holders provided the source is fully acknowledged. Reproduction of material in this information product for resale or other commercial purposes is prohibited without written permission of the copyright holders. Applications for such permission should be addressed to the Chief, Publishing Management Service, Information Division, FAO, Viale delle Terme di Caracalla, 00100 Rome, Italy or by e-mail to copyright@fao.org

© FAO 2007

Table of Contents

<i>Acknowledgements</i>	<i>i</i>
<i>Summary and Recommendations</i>	<i>ii</i>
Introduction	1
Methodology	1
Results	1
Appendix 1. List of participants	7
Appendix 2. Itinerary	8
Appendix 3. Rainfall data, May 2006 – April 2007	9
Appendix 4. Survey results	11
Appendix 5. Survey map	34
Appendix 6. Proposed Joint Survey itinerary for 2007	35
Appendix 7. Photos	36

Acknowledgements

The joint survey team would like to express their special gratitude to the Plant Protection Adviser and Director General, the Deputy Director (HQ), Department of Plant Protection (DPP), Government of Pakistan, and to the Director of the Plant Protection Organization (PPO), I. R. Iran for extending their generous support and guidance. The participants also appreciate the assistance of the Sistan and Baluchistan Jihad-e Agriculture Organization for providing facilities during the survey in I.R. Iran.

Special thanks are also due to Mr. Ghaemian from I. R. Iran for sending the results of the survey to DPP in Karachi, PPO in Tehran, and FAO's Desert Locust Information Service (DLIS) in Rome, for training provided to the Iranian participants, for preparing special maps for GPS and for his assistance and technical support before, during and after the survey.

The team is extremely grateful to the FAO Headquarters staff, in particular Mr. Keith Cressman, SW Asia Commission Secretary, and Ms. Isabel Denis, as well as FAO Representatives in Islamabad and Tehran for providing administrative and technical support.

Summary and Recommendations

The 2007 Desert Locust joint survey was the 13th survey of the spring breeding areas of southern Baluchistan of Pakistan and I.R. Iran and the most successful since its re-establishment in 1995. The survey was conducted for 32 days from 1 April to 1 May 2007.

The joint survey team consisted of two locust experts from Pakistan and three from I.R. Iran. The survey commenced on 1 April from Pakistan and concluded on the 16th. The survey team crossed into I.R. Iran on 17 April and concluded on the 30th. On 1 May, Directors of the Locust Units in both countries met in Zahedan to discuss the results of the survey. During this Joint Survey, the survey team covered 4,415 km in Pakistan and 4,969 km in I.R. Iran. The team made 63 stops in Pakistan and 70 stops in I.R. Iran.

Good rains fell this spring throughout most of Baluchistan. Consequently, ecological conditions were favourable for breeding, mainly near the coast.

During the survey, small-scale breeding was observed in coastal and subcoastal areas in Pakistan between Turbat, Pasni and Ormara, and on the Iranian coast near Chabahar and in the interior near Iranshahr. The team saw a small mature swarm on 13 April on the Pakistani coast on their way to Uthal from Pasni. It is not clear the origin or source of this swarm.

As there was one generation of breeding this year during the spring in Baluchistan, low numbers of solitary adults are likely to leave these areas once vegetation dries out and move to the summer breeding areas along both sides of the Indo-Pakistan border.

The team suggests the following recommendations that to improve future joint surveys:

1. Regional level training should be organized and assisted by FAO for PPO/DPP staff in both countries to meet any emergency and to become familiar with Desert Locust survey and control methods and the use of GPS, eLocust2, laptop computers and other equipment provided by the Commission.
2. Regular survey of winter/spring breeding areas in southern Baluchistan should be undertaken in both countries each year from 1 February to 31 May to check locust activity and any potential movement from across the Persian Gulf.
3. Three drivers and one mechanic-driver be nominated by Pakistan. The latter should carry an essential tool kit for immediate repair of vehicles to avoid interruption of the survey.
4. The night halt at Jiwani, Pakistan should be changed and three overnights in Kharan should be scheduled in order to survey the vast areas of Naru and Shamsi in Kharan district.
5. The survey teams of both countries should camp at least one night in the desert in each country to become familiar with the locust habitat.
6. As the joint survey is a tough job, the DSA rate must be increased in view of inflation.
7. The survey should be continued in the coming year to assess the locust situation and possible infiltration from the Persian Gulf.
8. Whenever locust control operations occur in Pakistan, PPO locust officers in I.R. Iran should be invited for practical training, sponsored by the Commission.
9. Mr. Ghaemian from I.R. Iran produced two special maps for GPS. One of them shows area names of Sistan & Baluchistan, Hormozgan and Kerman provinces. The other shows vegetation of the first decade of April. These maps were used by the team and they were very useful in finding green vegetation and determining survey stop names. It is recommended that the same maps be produced for the Pakistani side.

10. A one-day border meeting is sufficient in years when the joint survey team does not find any locusts; otherwise, an additional day is needed for extended discussions between the Locust Unit Directors, such was the case this year.

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

April 2007

Introduction

This was 13th annual joint Desert Locust survey that started in 1995.

The main objectives of the survey were to evaluate the Desert Locust activity in its spring breeding areas in I.R. Iran and Pakistan, and to assess the possibility of infiltration from the Central Region. In addition to the usual area, the results of the joint survey are used in planning survey and control operations in the summer breeding areas along the Indo-Pakistan border.

The joint survey team consisted of two Desert Locust experts from Pakistan and three experts from I.R. Iran (Appendix 1).

The team traveled a total of 9,384 km of which 4,415 km were in Pakistan and 4,969 km in I.R. Iran. During the survey, the team made 133 stops (covering roughly 14,530 ha) to check ecological conditions and the locust situation: 63 stops (7,530 ha) in Pakistan and 70 stops (7,000 ha) in I.R. Iran (Appendices 2 and 4).

The survey was carried out according to the itinerary proposed by FAO DLIS with minor modifications in Pakistan because of inapproachable roads due to rainfall (Appendices 3a and 3b).

Methodology

The joint survey was conducted according to the *FAO Desert Locust Guidelines*. The team checked all potential areas including habitats where locusts have often been found in the past as well as those areas where vegetation was green and rains had recently fallen.

At each of the 133 stops made during the survey, foot transects of about 300-400 meters long and about 1-4 meters wide were used for collecting data.

Each team used eLocust2 for recording coordinates of each survey site and the observations made during the foot transects. This information was also recorded on the *FAO Desert Locust Survey and Control Form* by the locust officers of both countries. This year, the team used custom GPS maps, on a trial basis, prepared by Mr. Ghaemian that showed SPOT-VGT imagery and village names to help find green vegetation.

The team also collected any rainfall data that was available at locust outposts or district offices in the survey area in both countries.

Results

Low to heavy rainfall occurred this spring throughout most of western Pakistan. The rains were heaviest in the Pasni and Gwadar areas during March 2007. Consequently, vegetation was mostly green and solitary locust populations were present in most all of the areas near Pasni and Turbat.

For the purpose of this report, the surveyed region of Baluchistan in both countries can be divided geographically into three parts, Northern, Central and Southern. Rainfall data and survey results (downloaded from eLocust2) are presented in Appendices 3 and 4. A map of the survey route is presented in Appendix 5, a proposed itinerary for the 2008 Joint Survey in Appendix 6, and photos taken during the survey are in Appendix 7.

Northern Baluchistan

The Northern part of Baluchistan is the area from Zahedan, I.R. Iran to Nushki, Pakistan. High elevation sandy and rocky plains dominate this area. The vegetation from Taftan to Nushki was green due to rainfall, the latest being on 31 March, and the soil was wet.

No solitary or gregarious locust activity was observed in this area.

Central Baluchistan

The central part of Baluchistan extends from south of Zahedan, I.R. Iran and the Ras Kooh Mountains in Pakistan to the Kech and Mand mountains north of Turbat in Pakistan. This region consists of the Great Sandy Desert west of Kharan Valley and, to the south, the Rakhshan Valley of Panjgur that continue west to the Saravan, Suran, Zaboli valleys in I.R. Iran, which eventually ends on the western edge of the Jaz Murian Basin near Kahnuj.

As result of recent rainfall in March, the vegetation was green to semi-green. In Pakistan, isolated solitarious mature adults were seen at one place in the Kharan Valley and one place towards Panjgur. There were also reports of locusts in some unapproachable areas of Shamsi in Kharan where surveys were not possible. In I.R. Iran, similar populations were seen at three places between Saravan and Bampur, and near Jaz Murian. Small-scale breeding was detected near Bampur where isolated solitarious hoppers and mature adults were seen.

The details of the locust infestations are summarized below.

Date	Locality	Coordinates	Locust density	Locust maturity
4-4-07	Usefwal	283119N/652529E	3/600m ²	mature adults
5-4-07	Kasuk2	272210N/645929E	2/800m ²	mature adults
19-4-07	Rig jayi	272149N/615513E	1/ha	mature adults
19-4-07	Qadar abad	270821N/613437E	6/3000m ²	mature adults
20-4-07	Motor davari	270757N/604357E	1/1000m ² 6/5000m ²	L3 hoppers mature adults
21-4-07	Sardagal	271455N/602438E	1/ha	mature adults
28-4-07	Chahali	270552N/594009E	1/ha	mature adults

Southern Baluchistan

The southern portion of Baluchistan consists of the coastal area that extends from Bandar Abbas, I.R. Iran in the west to Uthal, Pakistan in the east. This includes Jask, Chahbahar and Gwater in I.R. Iran, and Jiwani, Gwadar, Pasni and Ormara in Pakistan. Of all of these places, the highest frequency breeding areas are between Turbat and Pasni in Pakistan and from Chahbahar to Gwater in I.R. Iran.

The weather was pleasant during the entire period of the survey except the last week when it was very hot. Because of this, vegetation in southern I.R. Iran near Bandar Abbas, Minab, Kahnuj and Iranshahr was drying out or already dry although perennial bushes were still green or semi green. The soil was dry in most areas. Ecological conditions were favorable for locust breeding in the coastal areas of Pakistan and in parts of I.R. Iran.

In Pakistan, the team saw a yellow swarm of about 80 ha in size was seen on 13 April near the coast on their way to Uthal from Pasni. This was reported to the national locust officers in Pasni. The team also observed small-scale breeding south of Turbat in the Shooli Valley and on the coast between Gwadar and Pasni; higher numbers of hoppers were seen on the coast between Pasni and Ormara. Low numbers of solitarious adults were present further east near Uthal where heavy rain fell on 18 March 2007.

In I.R. Iran, the team saw low numbers of solitarious mature adults at several places on the coastal plains from the Pakistani border to Jask. Small-scale breeding was in progress at two places west of Chabahar.

The details of the locust infestations are summarized below.

Date	Locality	Coordinates	Locust density	Locust maturity
9-4-07	Sulaika II	255237N/624404E	20/2400m ²	mature adults
9-4-07	Shooli	253529N/620715E	20/800m ² 4/5000m ²	L2-L5 hoppers maturing adults
10-4-07	Kohjani	251328N/620900E	1/ha	mature adults
11-4-07	Chukli	251841N/630143E	8/800m ²	copulating adults
12-4-07	Sardasht	252607N/631017E	5/2000m ²	mature adults
12-4-07	Romaru	252333N/634142E	low number 55/2000m ²	L3-L4 hoppers solitary adults
12-4-07	Umer Ruk	252405N/634658E	17/1600m ²	mature adults
12-4-07	Buzzy	252830N/635506E	high density 70/2000 m ²	L2-L5 hoppers, fledglings mature adults
12-4-07	Kahoordan	252430N/642619E	3/4500 m ²	mature adults
12-4-07	Spatpost	252822N/655318E	1/5000 m ²	mature adults
13-4-07	Pawan	254111N/663828E	4/3 ha	mature adults
13-4-07	Ziropoint	254105N/663636E	1/2 ha	mature adults
22-4-07	Maleki I	252639N/603923E	3/6000 m ²	mature adults
22-4-07	Maleki II	252823N/603847E	10/2000 m ²	mature adults
22-4-07	Vashnam II	252628N/604926E	55/3000 m ²	mature adults
22-4-07	Vashnam III	252612N/604442E	250/4000 m ²	mature adults
23-4-07	Ramin	251616N/604701E	17/ha	mature adults
23-4-07	Lipar	251609N/605031E	3/ha	mature adults
23-4-07	Kachok	251459N/605328E	2/10 ha	mature adults
23-4-07	Bris	250530N/611901E	3/ha	mature adults
24-4-07	Jahlian	252841N/602048E	6/ha	mature adults
24-4-07	Bir	252718N/594853E	1/ha 6/600 m ²	fledglings mature adults
24-4-07	Poshti	252945N/592713E	10/1000 m ² 37/1000 m ²	L2-L5 hoppers mature adults
24-4-07	Keki	253118N/592538E	7/2000 m ²	mature adults
25-4-07	Behal	254145N/575237E	3/ha	mature adults
25-4-07	Tozoki	254226N/575609E	5/1000 m ²	mature adults

APPENDICES

Appendix 1. List of participants

I.R. Iran

Team Leader	Abbas Rashidi Moghaddam	PPO expert	Tehran PPO
Locust Officer	Nouraldin Mirlashari	PPO expert	Chabahar
Environmental Asst.	Mahdi Boroumand	Director asst.	Minab
Drivers	Golmohammad Abravesh		Chabahar
	Mehrab Javam		Chabahar
	Nourali Nouri		Tehran
	Enayatollah Rigi		Saravan

Pakistan

Team Leader	Muhammad Ramazan	Entomologist	Karachi
Locust Officer	Lal Khan	Asst. Entomologist	Sukkur
Maintenance Asst.	Miskan	Maintenance	Pasni
Drivers	Muhammad Aslam		Karachi HQ
	Muhammad Nasim		Kharan
	Allah Wasaya		Bahawalpur
	Abdul Qadeer		Lahore

Appendix 2. Itinerary

Date	Route	km	Overnight
1 Apr	Taftan		Taftan
2 Apr	Taftan, Yekmach, Kallyvallidad, Peshek, Kurodak, Nukchah	553	Noshki
3 Apr	Paddin, Barshonki, Noroz Kalat, Bhoporek, Tumolk	152	Kharan
4 Apr	Yousefwall, Tagazahi, Sopak, Naru, Garok, Saravan	225	Kharan
5 Apr	Dali, Momaiei, Nag, Jath, Kasug	357	Panjgoor
6 Apr	Shahukan, Bonistan, Chakol, Dalkdup	140	Panjgoor
7 Apr	Panjgur, Kohak, Katagary, Zankoh, Sang Kalat, Saidan	280	Turbat
8 Apr	Turbat, Mand Area	280	Turbat
9 Apr	Turbat, Suntsar, Jiwani	287	Jiwani
10 Apr	Jiwani, Gwadar	98	Gwadar
11 Apr	Gwadar, Pasni	189	Pasni
12 Apr	Pasni, Urmara, Uthal	454	Uthal
13 Apr	Uthal, Khuzdar	350	Khuzdar
14 Apr	Khuzdar, Quetta	350	Quetta
15 Apr	Quetta, Rest Day	0	Quetta
16 Apr	Quetta, Taftan	700	Taftan
17 Apr	Cross The Border Into Iran	200	Zahedan
18 Apr	Zahedan, Khash, Gusht, Saravan	464	Saravan
19 Apr	Saravan, Suran, Esfandak, Zaboli, Saravan	405	Saravan
20 Apr	Saravan, Khash, Iranshahr	390	Iranshahr
21 Apr	Iranshahr, Espake, Nikshahr, Chabahar	425	Chabahar
22 Apr	Chabahar, Vashnam, Dashtyary, Negor, Chabahar	177	Chabahar
23 Apr	Chabahar, Beris, Pasabandar, Gowatr, Chabahar	376	Chabahar
24 Apr	Chabahar, Zarabad, Jask	478	Jask
25 Apr	Jask, Minab, Bandar Abbas	420	Bandar Abbas
26 Apr	Bandar Abbas Rest Day	0	Bandar Abbas
27 Apr	Bandar Abbas, Kahnoolj, Ghale Ganj, Sulan, Kahnoolj	542	Kahnoolj
28 Apr	Kahnoolj, Eastjazmoorian, Dalgan, Chah Hashem, Iranshahr	572	Iranshahr
29 Apr	Iranshahr, Khash, Zahedan	320	Zahedan
30 Apr	Final report	0	Zahedan
1 May	Border Meeting; Zahedan, Mirjaveh; Pakistani Team cross the border	200	Taftan

Total distance covered in I.R. Iran	4969 Km
Total distance covered in Pakistan	4415 Km
Total distance covered in JS2007	9384 Km
Total area surveyed in I.R. Iran	7000 ha
Total area surveyed in Pakistan	7530 ha
Total area surveyed in JS2007	14530 ha
Total stops visited in I.R. Iran	70
Total stops visited in Pakistan	63
Total stops visited in JS2007	133

Appendix 3. Rainfall station data, May 2006 – April 2007

A. Pakistan

Dalbandin																									
May		Jun		Jul		Aug		Sep		Oct		Nov		Dec		Jan		Feb		Mar		Apr			
Day	mm	Day	mm	Day	mm	Day	mm	Day	mm	Day	mm	Day	mm	Day	mm	Day	mm	Day	mm	Day	mm	Day	mm	Day	mm
				3	4							11	10			16	9	8	4						
				17	11											20	5								
				28	34											21	7								
																27	2								
																28	20								
																29	1								
Kharan																									
		10	8	9	4	2	4	27	15			17	3	25	12	16	10	21	3	11	12	1	4		
		20	0.2	17	11													23	2						
				28	34																				
Panjgur																									
				2	3							17	3	2	34			8	5	11	13				
				31	12									3	38			9	7	19	0.9				
														4	3										
														25	6										
														26	2										
Turbat																									
		22	1	31	10							16	6	3	40			12	5	11	16				
														4	2					19	1				
Jiwani																									
				11	13	8	13																		
Gwader																									
				11	13	8	13																		
Pasni																									
														2	12			3	3.8	18	53				
														3	69										
														4	2										
														24	5										
														25	22										
Uthal																									
						17	3							3	44					11	19				
														4	0.9					19	23				
Nushki																									
				9	4							15	10			16	2								
				17	11											20	5								
				28	34											21	7								
																27	2								
																28	20								
																29	1								

Appendix 3. Rainfall station data, May 2006 – April 2007 (cont.)

B. I.R. Iran

Khash																									
May		Jun		Jul		Aug		Sep		Oct		Nov		Dec		Jan		Feb		Mar		Apr			
Day	mm	Day	mm	Day	mm	Day	mm	Day	mm	Day	mm	Day	mm	Day	mm	Day	mm	Day	mm	Day	mm	Day	mm	Day	mm
7	2					7	3					16	5	1	2	22	1	4	1	9	1				
14	2											18	2	2	11	23	18	5	1	16	3				
														4	4			20	39	17	3				
														14	4			21	1						
														25	10			23	1						
Saravan																									
8	1					8	3			15	1			1	1	23	6	8	7	9	1				
														2	27					16	2				
														3	8					17	25				
														4	4										
														25	1										
Iranshahr																									
30	5													1	9	23	12	7	6	16	12				
														2	30			8	4	17	5				
														3	2			20	2						
														4	9										
														12	4										
														14	1										
														25	4										
Chabahar																									
								3	4			20	3	1	17	23	2	8	6	17	76				
														2	27			9	1						
														3	9										
														4	7										
														14	5										
														25	2										
Jask																									
												17	7.9	1	4	17	1	2	2	16	1				
												26	13	2	53			7	1	17	8				
														8	2			8	1	31	7				
														12	33										
														14	22										
Kahnuj																									
										23	3	22	25	22	6	21	35								

Appendix 4. Survey results

A. Pakistan

1	SURVEY STOP	1	2	3	4	5	6
1-1	date	1.4.07	1,4,07	1,4,07	1,4,07	2,4,07	2,4,07
1-2	name	Talab1	Talab2	Talab3	Sharak	Yek mach	Kally vally dad
1-3	latitude (N)	28,53,27	28,52,40	28,51,03	28,54,30	28,47,33	28,58,31
1-4	longitude (E or W)	61,35,31	61,36,03	61,37,01	61,35,00	64,03,45	64,19,00
2	ECOLOGY						
2-1	area (ha) of survey	100	80	200	250	130	150
2-2	habitat (wadi, plains, dunes, crops)	Dunes	Dunes	plains	Wadi	Dunes	plains
2-3	date of last rain	30,3,07	30,3,07	30,3,07	30,3,07	31,3,07	31,3,07
2-4	rain amount (mm or Low Moderate High)	Low	Low	Low	Low	Moderate	Moderate
2-5	vegetation (Dry, greening, green, Drying)	Dry	Dry	Dry	Green	Green	Drying
2-6	vegetation density (Low Medium Dense)	Low	Low	Low	Low	Low	Medium
2-7	soil moisture (wet/Dry)	Dry	Dry	Dry	Dry	Wet	Dry
3	LOCUSTS						
3-1	present or A	A	A	A	A	A	A
3-2	area infested (ha)						
4	HOPPERS						
4-1	hopper stages (H123456F)						
4-2	appearance (solitary, transiens,						
4-3	behaviour (isolated, scattered, groups)						
4-4	hopper density (/site or /m2)						
5	BANDS						
5-1	band stage (H12345F)						
5-2	band density (/m2 or Low Medium High)						
5-3	band sizes (m2 or ha)						
5-4	number of bands						
6	ADULTS						
6-1	maturity (immature, mature)						
6-2	appearance (solitary, transiens,						
6-3	behaviour (isolated, scattered, groups)						
6-4	adult density (/transect or /ha)						
6-5	breeding (copulating, laying)						
7	SWARMS						
7-1	maturity (immature, mature)						
7-2	swarm density (/m2 or Low Medium						
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)						
8	CONTROL						
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						
9	COMMENTS						

1	SURVEY STOP	1	2	3	4	5	6
1-1	date	2,4,07	2,4,07	2,4,07	3,4,07	3,4,07	3,4,07
1-2	name	Peshek	Kurodak	Nuckchah	Paddin	Barshonki	Noroz klat
1-3	latitude (N)	28,54,37	28,56,53	28,58,29	29,01,11	28,55,04	28,45,46
1-4	longitude (E or W)	64,38,15	64,42,32	64,49,15	65,45,18	65,39,49	65,36,57
2	ECOLOGY						
2-1	area (ha) of survey	150	170	180	120	130	140
2-2	habitat (wadi, plains, dunes, crops)	Dunes	Dunes	Dunes	Wadi	Crops	Wadi
2-3	date of last rain	31,3,07	31,3,07	31,3,07	1,4,07	1,4,07	1,4,07
2-4	rain amount (mm or Low Moderate High)	Moderate	Moderate	High	Low	Low	Low
2-5	vegetation (Dry, greening, green, Drying)	Green	Green	Green	Green	Green	Drying
2-6	vegetation density (Low Medium Dense)	Low	Low	Low	Medium	Dense	Medium
2-7	soil moisture (wet/Dry)	Wet	Wet	Wet	Wet	Wet	Dry
3	LOCUSTS						
3-1	present or A	A	A	A	A	A	A
3-2	area infested (ha)						
4	HOPPERS						
4-1	hopper stages (H123456F)						
4-2	appearance (solitary, transiens,						
4-3	behaviour (isolated, scattered, groups)						
4-4	hopper density (/site or /m2)						
5	BANDS						
5-1	band stage (H12345F)						
5-2	band density (/m2 or Low Medium High)						
5-3	band sizes (m2 or ha)						
5-4	number of bands						
6	ADULTS						
6-1	maturity (immature, mature)						
6-2	appearance (solitary, transiens,						
6-3	behaviour (isolated, scattered, groups)						
6-4	adult density (/transect or /ha)						
6-5	breeding (copulating, laying)						
7	SWARMS						
7-1	maturity (immature, mature)						
7-2	swarm density (/m2 or Low Medium						
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)						
8	CONTROL						
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						
9	COMMENTS						

1	SURVEY STOP	1	2	3	4	5	6
1-1	Date	3,4,07	3,4,07	3,4,07	4,4,07	4,4,07	4,4,07
1-2	Name	Boporek	Tumulk1	Tumulk2	Usefwal	Tagazahi	Sopak
1-3	latitude (N)	28,34,15	28,33,48	28,32,58	28,31,19	28,30,06	28,24,48
1-4	longitude (E or W)	65,19,43	65,17,14	65,15,06	65,25,29	65,26,43	65,27,59
2	ECOLOGY						
2-1	area (ha) of survey	50	60	150	120	130	140
2-2	habitat (wadi, plains, dunes, crops)	plains	Crops	Dunes	Dunes	Crops	Dunes
2-3	date of last rain	1,4,07	1,4,07	1,4,07	1,4,07	1,4,07	1,4,07
2-4	rain amount (mm or Low Moderate High)	Low	Low	Low	Low	Low	Low
2-5	vegetation (Dry, greening, green, Drying)	Drying	Green	Green	Green	Green	Green
2-6	vegetation density (Low Medium Dense)	Dense	Dense	Low	Low	Dense	Low
2-7	soil moisture (wet/Dry)	Dry	Wet	Wet	Wet	Wet	Wet
3	LOCUSTS						
3-1	present or A	A	A	A	P	A	A
3-2	area infested (ha)				1		
4	HOPPERS						
4-1	hopper stages (H123456F)						
4-2	appearance (solitary, transiens,						
4-3	behaviour (isolated, scattered, groups)						
4-4	hopper density (/site or /m2)						
5	BANDS						
5-1	band stage (H12345F)						
5-2	band density (/m2 or Low Medium High)						
5-3	band sizes (m2 or ha)						
5-4	number of bands						
6	ADULTS						
6-1	maturity (immature, mature)				M		
6-2	appearance (solitary, transiens,				S		
6-3	behaviour (isolated, scattered, groups)				I		
6-4	adult density (/transect or /ha)				3/600m ²		
6-5	breeding (copulating, laying)						
7	SWARMS						
7-1	maturity (immature, mature)						
7-2	swarm density (/m2 or Low Medium						
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)						
8	CONTROL						
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						
9	COMMENTS						

1	SURVEY STOP	1	2	3	4	5	6
1-1	date	4,4,07	4,4,07	4,4,07	5,4,07	5,4,07	5,4,07
1-2	name	Naru	Garok	Saravan	Dali	Momaee	Nag
1-3	latitude (N)	28,22,07	28,26,18	28,33,00	28,14,08	27,59,43	27,24,32
1-4	longitude (E or W)	65,32,10	65,41,02	65,31,55	65,41,24	65,46,59	65,06,49
2	ECOLOGY						
2-1	area (ha) of survey	100	50	60	120	130	140
2-2	habitat (wadi, plains, dunes, crops)	Dunes	Crops	Crops	Wadi	Crops	plains
2-3	date of last rain	1,4,07	1,4,07	1,4,07	1,4,07	1,4,07	19,3,07
2-4	rain amount (mm or Low Moderate High)	Low	Low	Low	Low	Low	Low
2-5	vegetation (Dry, greening, green, Drying)	Green	Green	Green	Green	Green	Green
2-6	vegetation density (Low Medium Dense)	Low	Dense	Dense	Medium	Dense	Low
2-7	soil moisture (wet/Dry)	Wet	Wet	Wet	Dry	Wet	Dry
3	LOCUSTS						
3-1	present or A	A	A	A	A	A	A
3-2	area infested (ha)						
4	HOPPERS						
4-1	hopper stages (H123456F)						
4-2	appearance (solitary, transiens, gregarious)						
4-3	behaviour (isolated, scattered, groups)						
4-4	hopper density (/site or /m2)						
5	BANDS						
5-1	band stage (H12345F)						
5-2	band density (/m2 or Low Medium High)						
5-3	band sizes (m2 or ha)						
5-4	number of bands						
6	ADULTS						
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)						
7	SWARMS						
7-1	maturity (immature, mature)						
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)						
7-6	flying (direction, time passing)						
7-7	flying height (Low Medium High)						
8	CONTROL						
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						
9	COMMENTS						

1	SURVEY STOP	1	2	3	4	5	6
1-1	date	5,4,07	5,4,07	5,4,07	6,4,07	6,4,07	6,4,07
1-2	name	Jath	Kasuk1	Kasuk2	Shahukan	Bonistan	Chakol1
1-3	latitude (N)	27,22,58	27,22,13	27,22,10	26,56,38	26,54,59	26,51,53
1-4	longitude (E or W)	65,03,10	65,00,24	64,59,29	64,03,52	64,01,52	63,58,16
2	ECOLOGY						
2-1	area (ha) of survey	50	50	120	130	140	130
2-2	habitat (wadi, plains, dunes, crops)	Dunes	Dunes	Dunes	Crops	Dunes	Dunes
2-3	date of last rain	19,3,07	19,3,07	19,3,07	19,3,07	19,3,07	19,3,07
2-4	rain amount (mm or Low Moderate High)	Low	Low	Low	Low	Low	Low
2-5	vegetation (Dry, greening, green, Drying)	Drying	Drying	Green	Green	Green	Drying
2-6	vegetation density (Low Medium Dense)	Medium	Medium	Medium	Low	Low	Low
2-7	soil moisture (wet/Dry)	Dry	Dry	Wet	Wet	Dry	Dry
3	LOCUSTS						
3-1	present or A	A	A	P	A	A	A
3-2	area infested (ha)			2			
4	HOPPERS						
4-1	hopper stages (H123456F)						
4-2	appearance (solitary, transiens, gregarious)						
4-3	behaviour (isolated, scattered, groups)						
4-4	hopper density (/site or /m2)						
5	BANDS						
5-1	band stage (H12345F)						
5-2	band density (/m2 or Low Medium High)						
5-3	band sizes (m2 or ha)						
5-4	number of bands						
6	ADULTS						
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)			2/800m ²			
6-5	breeding (copulating, laying)						
7	SWARMS						
7-1	maturity (immature, mature)						
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)						
7-6	flying (direction, time passing)						
7-7	flying height (Low Medium High)						
8	CONTROL						
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						
9	COMMENTS						

1	SURVEY STOP	1	2	3	4	5	6
1-1	date	6,4,07	6,4,07	7,4,07	7,4,07	7,4,07	7,4,07
1-2	name	Chakol2	Dalkdap	Kohak	Katagari	Zankoh	Sagkalat
1-3	latitude (N)	26,51,08	26,50,21	26,50,07	26,44,37	26,40,28	26,40,00
1-4	longitude (E or W)	63,56,01	63,54,11	64,01,32	64,02,57	64,00,02	63,59,04
2	ECOLOGY						
2-1	area (ha) of survey	50	50	100	50	140	130
2-2	habitat (wadi, plains, dunes, crops)	plains	Dunes	Dunes	Beach	plains	Dunes
2-3	date of last rain	19,3,07	19,3,07	19,3,07	19,3,07	19,3,07	19,3,07
2-4	rain amount (mm or Low Moderate High)	Low	Low	Low	Low	Low	Low
2-5	vegetation (Dry, greening, green, Drying)	Green	Green	Green	Green	Drying	Green
2-6	vegetation density (Low Medium Dense)	Low	Medium	Low	Low	Medium	Medium
2-7	soil moisture (wet/Dry)	Dry	Dry	Dry	Dry	Dry	Dry
3	LOCUSTS						
3-1	present or A	A	A	A	A	A	A
3-2	area infested (ha)						
4	HOPPERS						
4-1	hopper stages (H123456F)						
4-2	appearance (solitary, transiens, gregarious)						
4-3	behaviour (isolated, scattered, groups)						
4-4	hopper density (/site or /m2)						
5	BANDS						
5-1	band stage (H12345F)						
5-2	band density (/m2 or Low Medium High)						
5-3	band sizes (m2 or ha)						
5-4	number of bands						
6	ADULTS						
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)						
7	SWARMS						
7-1	maturity (immature, mature)						
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)						
7-6	flying (direction, time passing)						
7-7	flying height (Low Medium High)						
8	CONTROL						
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						
9	COMMENTS						

1	SURVEY STOP	1	2	3	4	5	6
1-1	date	7,4,07	8,4,07	8,4,07	8,4,07	8,4,07	9,4,07
1-2	name	Saidan	Mirabad	Dukob	Gawak	Soro	Sulaika1
1-3	latitude (N)	26,38,04	26,05,47	26,05,50	26,06,55	26,07,39	25,52,53
1-4	longitude (E or W)	63,54,19	62,14,30	62,09,49	62,03,51	62,02,13	62,44,21
2	ECOLOGY						
2-1	area (ha) of survey	120	120	130	120	150	100
2-2	habitat (wadi, plains, dunes, crops)	plains	plains	Dunes	Dunes	Dunes	Crops
2-3	date of last rain	19,3,07	19,3,07	19,3,07	19,3,07	19,3,07	19,3,07
2-4	rain amount (mm or Low Moderate High)	Low	Low	Low	Low	Low	Low
2-5	vegetation (Dry, greening, green, Drying)	Green	Green	Green	Drying	Drying	Green
2-6	vegetation density (Low Medium Dense)	Low	Medium	Low	Medium	Medium	Medium
2-7	soil moisture (wet/Dry)	Dry	Dry	Dry	Dry	Dry	Dry
3	LOCUSTS						
3-1	present or A	A	A	A	A	A	A
3-2	area infested (ha)						
4	HOPPERS						
4-1	hopper stages (H123456F)						
4-2	appearance (solitary, transiens, gregarious)						
4-3	behaviour (isolated, scattered, groups)						
4-4	hopper density (/site or /m2)						
5	BANDS						
5-1	band stage (H12345F)						
5-2	band density (/m2 or Low Medium High)						
5-3	band sizes (m2 or ha)						
5-4	number of bands						
6	ADULTS						
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)						
7	SWARMS						
7-1	maturity (immature, mature)						
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)						
7-6	flying (direction, time passing)						
7-7	flying height (Low Medium High)						
8	CONTROL						
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						
9	COMMENTS						

1	SURVEY STOP	1	2	3	4	5	6
1-1	date	9,4,07	9,4,07	9,4,07	9,4,07	9,4,07	10,4,07
1-2	name	Sulaika II	Maksar	Darvar	Zarinbog	Shooli	Gunz
1-3	latitude (N)	25,52,37	25,41,10	25,39,51	25,37,36	25,35,29	25,06,18
1-4	longitude (E or W)	62,44,04	62,31,33	62,20,16	62,13,17	62,07,15	61,53,38
2	ECOLOGY						
2-1	area (ha) of survey	120	130	120	130	50	120
2-2	habitat (wadi, plains, dunes, crops)	Dunes	Dunes	Dunes	Dunes	Dunes	Beach
2-3	date of last rain	19,3,07	19,3,07	19,3,07	19,3,07	19,3,07	18,3,07
2-4	rain amount (mm or Low Moderate High)	Low	Low	Low	Low	Low	High
2-5	vegetation (Dry, greening, green, Drying)	Green	Drying	Drying	Green	Drying	Drying
2-6	vegetation density (Low Medium Dense)	Low	Low	Low	Medium	Low	Low
2-7	soil moisture (wet/Dry)	Dry	Dry	Dry	Dry	Dry	Dry
3	LOCUSTS						
3-1	present or A	P	A	A	A	P	A
3-2	area infested (ha)	2				2	
4	HOPPERS						
4-1	hopper stages (H123456F)					2,3,4,5	
4-2	appearance (solitary, transiens, gregarious)					S	
4-3	behaviour (isolated, scattered, groups)					I	
4-4	hopper density (/site or /m2)					20/800m ²	
5	BANDS						
5-1	band stage (H12345F)						
5-2	band density (/m2 or Low Medium High)						
5-3	band sizes (m2 or ha)						
5-4	number of bands						
6	ADULTS						
6-1	maturity (immature, mature)	M				IM	
6-2	appearance (solitary, transiens, gregarious)	S				S	
6-3	behaviour (isolated, scattered, groups)	I				I	
6-4	adult density (/transect or /ha)	20/2400m ²				4/5000m ²	
6-5	breeding (copulating, laying)						
7	SWARMS						
7-1	maturity (immature, mature)						
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)						
7-6	flying (direction, time passing)						
7-7	flying height (Low Medium High)						
8	CONTROL						
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						
9	COMMENTS						

1	SURVEY STOP	1	2	3	4	5	6
1-1	date	10,4,07	10,4,07	10,4,07	11,4,07	11,4,07	11,4,07
1-2	name	Pishukan	Shabi	Kohjani	Kapper	Nalient	Chukkli
1-3	latitude (N)	25,10,02	25,12,25	25,13,28	25,18,43	25,20,03	25,18,41
1-4	longitude (E or W)	62,02,00	62,05,25	62,09,00	62,44,49	62,46,52	63,01,43
2	ECOLOGY						
2-1	area (ha) of survey	140	150	160	130	120	150
2-2	habitat (wadi, plains, dunes, crops)	plains	Dunes	Dunes	plains	Crops	plains
2-3	date of last rain	18,3,07	18,3,07	18,3,07	18,3,07	18,3,07	18,3,07
2-4	rain amount (mm or Low Moderate High)	High	High	High	High	High	High
2-5	vegetation (Dry, greening, green, Drying)	Drying	Drying	Green	Green	Green	Green
2-6	vegetation density (Low Medium Dense)	Low	Low	Medium	Low	Dense	Low
2-7	soil moisture (wet/Dry)	Wet	Wet	Wet	Dry	Wet	Wet
3	LOCUSTS						
3-1	present or A	A	A	P	A	A	P
3-2	area infested (ha)			1			2
4	HOPPERS						
4-1	hopper stages (H123456F)						
4-2	appearance (solitary, transiens, gregarious)						
4-3	behaviour (isolated, scattered, groups)						
4-4	hopper density (/site or /m2)						
5	BANDS						
5-1	band stage (H12345F)						
5-2	band density (/m2 or Low Medium High)						
5-3	band sizes (m2 or ha)						
5-4	number of bands						
6	ADULTS						
6-1	maturity (immature, mature)			M			M
6-2	appearance (solitary, transiens, gregarious)			S			S
6-3	behaviour (isolated, scattered, groups)			I			I
6-4	adult density (/transect or /ha)			1/1h			8/800m ²
6-5	breeding (copulating, laying)						C
7	SWARMS						
7-1	maturity (immature, mature)						
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)						
7-6	flying (direction, time passing)						
7-7	flying height (Low Medium High)						
8	CONTROL						
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						
9	COMMENTS						

1	SURVEY STOP	1	2	3	4	5	6
1-1	date	11,4,07	11,4,07	12,4,07	12,4,07	12,4,07	12,4,07
1-2	name	Gano	Sardasht	Romaru	Umer ruk	Buzzy	Kahoordan
1-3	latitude (N)	25,25,28	25,26,07	25,23,33	25,24,05	25,28,30	25,24,30
1-4	longitude (E or W)	63,11,13	63,10,17	63,41,42	63,46,59	63,55,07	64,26,19
2	ECOLOGY						
2-1	area (ha) of survey	100	180	150	140	100	60
2-2	habitat (wadi, plains, dunes, crops)	Dunes	Dunes	Dunes	plains	Dunes	plains
2-3	date of last rain	18,3,07	18,3,07	18,3,07	18,3,07	18,3,07	18,3,07
2-4	rain amount (mm or Low Moderate High)	High	High	High	High	High	High
2-5	vegetation (Dry, greening, green, Drying)	Green	Green	Green	Green	Green	Green
2-6	vegetation density (Low Medium Dense)	Low	Medium	Medium	Low	Medium	Low
2-7	soil moisture (wet/Dry)	Wet	Wet	Wet	Wet	Wet	Dry
3	LOCUSTS						
3-1	present or A	A	P	P	P	P	P
3-2	area infested (ha)		5	10	5	10	3
4	HOPPERS						
4-1	hopper stages (H123456F)			3,4		2,3,4,5, F	
4-2	appearance (solitary, transiens, gregarious)			S		S	
4-3	behaviour (isolated, scattered, groups)			I		I	
4-4	hopper density (/site or /m2)			L		H	
5	BANDS						
5-1	band stage (H12345F)						
5-2	band density (/m2 or Low Medium High)						
5-3	band sizes (m2 or ha)						
5-4	number of bands						
6	ADULTS						
6-1	maturity (immature, mature)		M	M	M	M	M
6-2	appearance (solitary, transiens, gregarious)		S	S	S	S	S
6-3	behaviour (isolated, scattered, groups)		I	I	I	I	I
6-4	adult density (/transect or /ha)		5/2000m ²	55/2000m ²	17/1600m ²	70/2000m ²	3/4500m ²
6-5	breeding (copulating, laying)						
7	SWARMS						
7-1	maturity (immature, mature)						
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)						
7-6	flying (direction, time passing)						
7-7	flying height (Low Medium High)						
8	CONTROL						
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						
9	COMMENTS						

1	SURVEY STOP	1	2	3	4	5	6
1-1	date	12,4,07	13,4,07	13,4,07			
1-2	name	Spatpost	Pawan	Ziropoint			
1-3	latitude (N)	25,28,22	25,41,11	25,41,05			
1-4	longitude (E or W)	65,53,18	66,38,28	66,36,36			
2	ECOLOGY						
2-1	area (ha) of survey	50	150	150			
2-2	habitat (wadi, plains, dunes, crops)	Dunes	Dunes	Dunes			
2-3	date of last rain	19,3,07	19,3,07	19,3,07			
2-4	rain amount (mm or Low Moderate High)	Moderate	Low	Low			
2-5	vegetation (Dry, greening, green, Drying)	Green	Green	Green			
2-6	vegetation density (Low Medium Dense)	Dense	Medium	Medium			
2-7	soil moisture (wet/Dry)	Dry	Dry	Dry			
3	LOCUSTS						
3-1	present or A	P	P	P			
3-2	area infested (ha)	10	3	2			
4	HOPPERS						
4-1	hopper stages (H123456F)						
4-2	appearance (solitary, transiens, gregarious)						
4-3	behaviour (isolated, scattered, groups)						
4-4	hopper density (/site or /m2)						
5	BANDS						
5-1	band stage (H12345F)						
5-2	band density (/m2 or Low Medium High)						
5-3	band sizes (m2 or ha)						
5-4	number of bands						
6	ADULTS						
6-1	maturity (immature, mature)	M	M	M			
6-2	appearance (solitary, transiens, gregarious)	S	S	S			
6-3	behaviour (isolated, scattered, groups)	I	I	I			
6-4	adult density (/transect or /ha)	1/5000m ²	4/3 ha	1/2 ha			
6-5	breeding (copulating, laying)						
7	SWARMS						
7-1	maturity (immature, mature)						
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)						
7-6	flying (direction, time passing)						
7-7	flying height (Low Medium High)						
8	CONTROL						
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						
9	COMMENTS						

B. I.R. Iran

1	SURVEY STOP	1	2	3	4	5	6
1-1	Date	18/ 4/ 07	18/ 4/ 07	18/ 4/ 07	18/ 4/ 07	18/ 4/ 07	18/ 4/ 07
1-2	Name	Dehbala	Aliabad	Chah shahi	Hoshak	Pol mashkid	Gonban
1-3	latitude (N)	28.17.09	28.05.04	27.31.29	27.24.28	27.06.04	27.15.05
1-4	longitude (E or W)	61.25.21	61.29.47	62.08.38	62.16.55	62.39.19	62.31.13
2	ECOLOGY						
2-1	area (ha) of survey	70	100	120	80	70	50
2-2	habitat (wadi, plains, dunes, crops)	Dunes	Dunes	Dunes	plains	Beach	plains
2-3	date of last rain	2/ 4/ 07	2/ 4/ 07	25/ 3/ 07	25/ 3/ 07	25/ 3/ 07	25/ 3/ 07
2-4	rain amount (mm or Low Moderate High)	Low	Low	Low	Low	Low	Low
2-5	vegetation (Dry, greening, green, Drying)	Drying	Drying	Drying	Drying	Drying	Drying
2-6	vegetation density (Low Medium Dense)	Low	Low	Low	Low	Low	Low
2-7	soil moisture (wet/Dry)	Dry	Dry	Dry	Dry	Dry	Dry
3	LOCUSTS						
3-1	present or A	A	A	A	A	A	A
3-2	area infested (ha)						
4	HOPPERS						
4-1	hopper stages (H123456F)						
4-2	appearance (solitary, transiens, gregarious)						
4-3	behaviour (isolated, scattered, groups)						
4-4	hopper density (/site or /m2)						
5	BANDS						
5-1	band stage (H12345F)						
5-2	band density (/m2 or Low Medium High)						
5-3	band sizes (m2 or ha)						
5-4	number of bands						
6	ADULTS						
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)						
7	SWARMS						
7-1	maturity (immature, mature)						
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)						
7-6	flying (direction, time passing)						
7-7	flying height (Low Medium High)						
8	CONTROL						
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						
9	COMMENTS						

1	SURVEY STOP	1	2	3	4	5	6
1-1	date	19/ 4/ 07	19/ 4/ 07	19/ 4/ 07	19/ 4/ 07	19/ 4/ 07	19/ 4/ 07
1-2	name	Rig jayi	Shandan	Garepaskuh	Hushab hutomar	Kohne magar	Qader abad
1-3	latitude (N)	27.21.49	27.23.03	27.29.07	27.08.52	27.08.16	27.08.21
1-4	longitude (E or W)	61.55.13	61.54.01	61.42.02	61.48.30	61.44.17	61.34.37
2	ECOLOGY						
2-1	area (ha) of survey	50	100	100	70	100	150
2-2	habitat (wadi, plains, dunes, crops)	Dunes	Dunes	plains	Dunes	plains	Dunes
2-3	date of last rain	25/ 3/ 07	25/ 3/ 07	25/ 3/ 07	25/ 3/ 07	25/ 3/ 07	25/3/ 07
2-4	rain amount (mm or Low Moderate High)	Low	Low	Low	Low	Low	Low
2-5	vegetation (Dry, greening, green, Drying)	Drying	Drying	Drying	Drying	Drying	Drying
2-6	vegetation density (Low Medium Dense)	Low	Low	Low	Medium	Medium	Medium
2-7	soil moisture (wet/Dry)	Dry	Dry	Dry	Dry	Dry	Dry
3	LOCUSTS						
3-1	present or A	P	A	A	A	A	P
3-2	area infested (ha)	1					5
4	HOPPERS						
4-1	hopper stages (H123456F)						
4-2	appearance (solitary, transiens, gregarious)						
4-3	behaviour (isolated, scattered, groups)						
4-4	hopper density (/site or /m2)						
5	BANDS						
5-1	band stage (H12345F)						
5-2	band density (/m2 or Low Medium High)						
5-3	band sizes (m2 or ha)						
5-4	number of bands						
6	ADULTS						
6-1	maturity (immature, mature)	M					M
6-2	appearance (solitary, transiens, gregarious)	S					S
6-3	behaviour (isolated, scattered, groups)	I					I
6-4	adult density (/transect or /ha)	1/1 ha					6/3000 m ²
6-5	breeding (copulating, laying)						
7	SWARMS						
7-1	maturity (immature, mature)						
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)						
7-6	flying (direction, time passing)						
7-7	flying height (Low Medium High)						
8	CONTROL						
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						
9	COMMENTS						

1	SURVEY STOP	1	2	3	4	5	6
1-1	date	20/ 4/ 07	20/ 4/ 07	20/ 4/ 07	20/ 4/ 07	21/ 4/ 07	21/ 4/ 07
1-2	name	Dasht abkhan	Motor davari	Sarkahuran	Kure meamari	Sardagal	Qalebampur
1-3	latitude (N)	28.03.26	27.07.57	27.10.10	27.07.43	27.14.55	27.12.10
1-4	longitude (E or W)	60.59.43	60.43.57	60.45.45	60.40.17	60.24.38	60.26.52
2	ECOLOGY						
2-1	area (ha) of survey	150	50	60	40	150	50
2-2	habitat (wadi, plains, dunes, crops)	plains	Dunes	Dunes	Dunes	plains	Dunes
2-3	date of last rain	2/ 4/ 07	8/ 2/ 07	8/ 2/ 07	8/ 2/ 07	8/ 2/ 07	8/ 2/ 07
2-4	rain amount (mm or Low Moderate High)	Low	Low	Low	Low	Low	Low
2-5	vegetation (Dry, greening, green, Drying)	Green	Drying	Drying	Drying	Drying	Green
2-6	vegetation density (Low Medium Dense)	Low	Low	Low	Low	Low	Low
2-7	soil moisture (wet/Dry)	Dry	Dry	Dry	Dry	Dry	Dry
3	LOCUSTS						
3-1	present or A	A	P	A	A	P	A
3-2	area infested (ha)		2			1	
4	HOPPERS						
4-1	hopper stages (H123456F)		L3				
4-2	appearance (solitary, transiens, gregarious)		S				
4-3	behaviour (isolated, scattered, groups)		I				
4-4	hopper density (/site or /m2)		1/ 1000m ²				
5	BANDS						
5-1	band stage (H12345F)						
5-2	band density (/m2 or Low Medium High)						
5-3	band sizes (m2 or ha)						
5-4	number of bands						
6	ADULTS						
6-1	maturity (immature, mature)		M			M	
6-2	appearance (solitary, transiens, gregarious)		S			S	
6-3	behaviour (isolated, scattered, groups)		I			I	
6-4	adult density (/transect or /ha)		6/ 5000m ²			1/ ha	
6-5	breeding (copulating, laying)						
7	SWARMS						
7-1	maturity (immature, mature)						
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)						
7-6	flying (direction, time passing)						
7-7	flying height (Low Medium High)						
8	CONTROL						
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						
9	COMMENTS						

1	SURVEY STOP	1	2	3	4	5	6
1-1	date	21.4.07	21.4.07	21.4.07	21.4.07	22.4.07	22.4.07
1-2	name	Shamsabad	Beheshtabad	Drazchah	Espakeh	Maleki1	Maleki2
1-3	latitude (N)	27.11.30	27.09.37	27.07.10	26.50.58	25.26.39	25.28.23
1-4	longitude (E or W)	60.21.43	60.11.05	60.03.37	60.10.02	60.39.23	60.38.47
2	ECOLOGY						
2-1	area (ha) of survey	50	200	150	50	200	100
2-2	habitat (wadi, plains, dunes, crops)	Dunes	Dunes	Dunes	Dunes	Plain	Plain
2-3	date of last rain	8.2.07	8.2.07	8.2.07	1.4.07	17.3.07	17.3.07
2-4	rain amount (mm or Low Moderate High)	Low	Low	Low	Low	High	High
2-5	Vegetation (Dry, greening, green, Drying)	Drying	Drying	Drying	Drying	Drying	Drying
2-6	Vegetation density (Low Medium Dense)	Low	Low	Low	Low	Medium	Medium
2-7	soil moisture (wet/Dry)	Dry	Dry	Dry	Dry	Dry	Dry
3	LOCUSTS						
3-1	present or A	A	A	A	A	P	P
3-2	area infested (ha)					1	15
4	HOPPERS						
4-1	hopper stages (H123456F)						
4-2	appearance (solitary, transiens, gregarious)						
4-3	behaviour (isolated, scattered, groups)						
4-4	hopper density (/site or /m2)						
5	BANDS						
5-1	band stage (H12345F)						
5-2	band density (/m2 or Low Medium High)						
5-3	band sizes (m2 or ha)						
5-4	number of bands						
6	ADULTS						
6-1	maturity (immature, mature)					mature	mature
6-2	appearance (solitary, transiens, gregarious)					solitary	solitary
6-3	behaviour (isolated, scattered, groups)					isolated	Isolated
6-4	adult density (/transect or /ha)					3/6000m ²	10/2000m ²
6-5	breeding (copulating, laying)						
7	SWARMS						
7-1	maturity (immature, mature)						
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)						
7-6	flying (direction, time passing)						
7-7	flying height (Low Medium High)						
8	CONTROL						
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						
9	COMMENTS						

1	SURVEY STOP	1	2	3	4	5	6
1-1	Date	22.4.07	22.4.07	22.4.07	22.4.07	23.4.07	23.4.07
1-2	name	Vashnam I	Vashnam II	Vashnam III	Mirgolbazar	Ramin	Lipar
1-3	latitude (N)	25.26.46	25.26.28	25.26.12	25.26.54	25.16.16	25.16.09
1-4	longitude (E or W)	60.44.10	60.44.26	60.44.43	60.48.26	60.47.01	60.50.31
2	ECOLOGY						
2-1	area (ha) of survey	150	150	50	30	50	40
2-2	habitat (wadi, plains, dunes, crops)	plains	Plains	plains	Dunes	Dunes	Dunes
2-3	date of last rain	17.3.07	17.3.07	17.3.07	17.3.07	17.3.07	17.3.07
2-4	rain amount (mm or Low Moderate High)	High	High	High	Low	High	High
2-5	vegetation (Dry, greening, green, Drying)	Drying	Drying	Drying	Dry	Drying	Drying
2-6	vegetation density (Low Medium Dense)	Low	Low	Low	Low	Medium	Medium
2-7	soil moisture (wet/Dry)	Dry	Dry	Dry	Dry	Dry	Dry
3	LOCUSTS						
3-1	present or A	A	P	P	A	P	P
3-2	area infested (ha)		15	20		15	2
4	HOPPERS						
4-1	hopper stages (H123456F)						
4-2	appearance (solitary, transiens, gregarious)						
4-3	behaviour (isolated, scattered, groups)						
4-4	hopper density (/site or /m2)						
5	BANDS						
5-1	band stage (H12345F)						
5-2	band density (/m2 or Low Medium High)						
5-3	band sizes (m2 or ha)						
5-4	number of bands						
6	ADULTS						
6-1	maturity (immature, mature)		Mature	mature		M	M
6-2	appearance (solitary, transiens, gregarious)		Solitary	Solitary		S	S
6-3	behaviour (isolated, scattered, groups)		Scattered	Scattered		I	I
6-4	adult density (/transect or /ha)		55/3000m ²	250/4000m ²		17/10000m ²	3/10000m ²
6-5	breeding (copulating, laying)						
7	SWARMS						
7-1	maturity (immature, mature)						
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)						
7-6	flying (direction, time passing)						
7-7	flying height (Low Medium High)						
8	CONTROL						
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						
9	COMMENTS						

1	SURVEY STOP	1	2	3	4	5	6
1-1	date	23.4.07	23.4.07	23.4.07	23.4.07	23.4.07	23.4.07
1-2	name	Gurankash	Kachok	Sham1	Sham2	Bris	Pasabandar
1-3	latitude (N)	25.16.03	25.14.59	25.11.32	25.12.13	25.05.30	25.04.19
1-4	longitude (E or W)	60.51.57	60.53.28	61.05.44	61.06.41	61.19.01	61.23.31
2	ECOLOGY						
2-1	area (ha) of survey	100	200	100	30	100	50
2-2	habitat (wadi, plains, dunes, crops)	plains	plains	Dunes	Crops	plains	plains
2-3	date of last rain	17.3.07	17.3.07	17.3.07	17.3.07	17.3.07	17.3.07
2-4	rain amount (mm or Low Moderate High)	High	High	High	Moderate	Low	Low
2-5	vegetation (Dry, greening, green, Drying)	Drying	Drying	Drying	Green	Drying	Drying
2-6	vegetation density (Low Medium Dense)	Medium	Medium	Medium	Medium	Low	Low
2-7	soil moisture (wet/Dry)	Dry	Dry	Dry	Dry	Dry	Dry
3	LOCUSTS						
3-1	present or A	A	P	A	A	P	A
3-2	area infested (ha)		10			1	
4	HOPPERS						
4-1	hopper stages (H123456F)						
4-2	appearance (solitary, transiens, gregarious)						
4-3	behaviour (isolated, scattered, groups)						
4-4	hopper density (/site or /m2)						
5	BANDS						
5-1	band stage (H12345F)						
5-2	band density (/m2 or Low Medium High)						
5-3	band sizes (m2 or ha)						
5-4	number of bands						
6	ADULTS						
6-1	maturity (immature, mature)		M			M	
6-2	appearance (solitary, transiens, gregarious)		S			S	
6-3	behaviour (isolated, scattered, groups)		I			I	
6-4	adult density (/transect or /ha)		2/10 ha			3/10000 m ²	
6-5	breeding (copulating, laying)						
7	SWARMS						
7-1	maturity (immature, mature)						
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)						
7-6	flying (direction, time passing)						
7-7	flying height (Low Medium High)						
8	CONTROL						
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						
9	COMMENTS						

1	SURVEY STOP	1	2	3	4	5	6
1-1	date	23.4.07	24.4.07	24.4.07	24.4.07	24.4.07	24.4.07
1-2	name	Gowatr	Parak	Dorahinikshshr	Jahlian	Shahdadkahir	Taran
1-3	latitude (N)	25.09.47	25.27.05	25.27.58	25.28.41	25.35.10	25.29.40
1-4	longitude (E or W)	61.29.49	60.35.58	60.20.48	60.20.48	60.05.51	59.54.04
2	ECOLOGY						
2-1	area (ha) of survey	30	40	100	200	100	200
2-2	habitat (wadi, plains, dunes, crops)	Dunes	Dunes	Dunes	plains	Dunes	plains
2-3	date of last rain	17.3.07	17.3.07	17.3.07	17.3.07	17.3.07	17.3.07
2-4	rain amount (mm or Low Moderate High)	Low	High	High	Moderate	Low	Low
2-5	vegetation (Dry, greening, green, Drying)	Drying	Drying	Drying	Drying	Drying	Drying
2-6	vegetation density (Low Medium Dense)	Low	Medium	Medium	Medium	Medium	Medium
2-7	soil moisture (wet/Dry)	Dry	Dry	Dry	Dry	Dry	Dry
3	LOCUSTS						
3-1	present or A	A	A	A	P	A	A
3-2	area infested (ha)				1		
4	HOPPERS						
4-1	hopper stages (H123456F)						
4-2	appearance (solitary, transiens, gregarious)						
4-3	behaviour (isolated, scattered, groups)						
4-4	hopper density (/site or /m2)						
5	BANDS						
5-1	band stage (H12345F)						
5-2	band density (/m2 or Low Medium High)						
5-3	band sizes (m2 or ha)						
5-4	number of bands						
6	ADULTS						
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)				6/ha		
6-5	breeding (copulating, laying)						
7	SWARMS						
7-1	maturity (immature, mature)						
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)						
7-6	flying (direction, time passing)						
7-7	flying height (Low Medium High)						
8	CONTROL						
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						
9	COMMENTS						

1	SURVEY STOP	1	2	3	4	5	6
1-1	date	24.4.07	24.4.07	24.4.07	24.4.07	24.4.07	24.4.07
1-2	name	Bir	Poshti	Keki	Hoomen	Gabrik	Siromch
1-3	latitude (N)	25.27.18	25.29.45	25.31.18	25.46.36	25.44.28	25.44.10
1-4	longitude (E or W)	59.48.53	59.27.13	59.25.38	58.33.27	58.29.55	58.14.38
2	ECOLOGY						
2-1	area (ha) of survey	200	100	50	100	200	200
2-2	habitat (wadi, plains, dunes, crops)	Dunes	Dunes	Dunes	Dunes	Dunes	Dunes
2-3	date of last rain	17.3.07	17.3.07	17.3.07	31.3.07	31.3.07	31.3.07
2-4	rain amount (mm or Low Moderate High)	Low	Moderate	Moderate	Low	Low	Low
2-5	vegetation (Dry, greening, green, Drying)	Drying	Drying	Green	Dry	Drying	Dry
2-6	vegetation density (Low Medium Dense)	Medium	Medium	Low	Low	Medium	Dense
2-7	soil moisture (wet/Dry)	Dry	Dry	Dry	Dry	Dry	Dry
3	LOCUSTS						
3-1	present or A	P	P	P	A	A	A
3-2	area infested (ha)	1	20	5			
4	HOPPERS						
4-1	hopper stages (H123456F)	F	2,3,4,5				
4-2	appearance (solitary, transiens, gregarious)	S	S				
4-3	behaviour (isolated, scattered, groups)	I	I				
4-4	hopper density (/site or /m2)	1/ha	10/1000m ²				
5	BANDS						
5-1	band stage (H12345F)						
5-2	band density (/m2 or Low Medium High)						
5-3	band sizes (m2 or ha)						
5-4	number of bands						
6	ADULTS						
6-1	maturity (immature, mature)	M	M	M			
6-2	appearance (solitary, transiens, gregarious)	S	S	S			
6-3	behaviour (isolated, scattered, groups)	I	I	I			
6-4	adult density (/transect or /ha)	4/600m2	37/1000m2	7/2000m2			
6-5	breeding (copulating, laying)						
7	SWARMS						
7-1	maturity (immature, mature)						
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)						
7-6	flying (direction, time passing)						
7-7	flying height (Low Medium High)						
8	CONTROL						
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						
9	COMMENTS						

1	SURVEY STOP	1	2	3	4	5	6
1-1	date	24.4.07	24.4.07	25.4.07	25.4.07	25.4.07	25.4.07
1-2	name	Jagin	Shahrnay	Behal	Tozoki	Kahuti	Tal
1-3	latitude (N)	22,44,05	25,41,54	25,41,45	25,42,26	25,41,47	25,43,38
1-4	longitude (E or W)	58,12,44	58,00,58	57,52,37	57,56,09	57,49,26	57,47,08
2	ECOLOGY						
2-1	area (ha) of survey	50	200	100	50	30	50
2-2	habitat (wadi, plains, dunes, crops)	Dunes	Dunes	Dunes	Dunes	Dunes	Dunes
2-3	date of last rain	31,3,07	31,3,07	31,3,07	31,3,07	31,3,07	31,3,07
2-4	rain amount (mm or Low Moderate High)	Low	Low	Low	Low	Low	Low
2-5	vegetation (Dry, greening, green, Drying)	Green	Drying	Drying	Drying	Green	Drying
2-6	vegetation density (Low Medium Dense)	Low	Medium	Medium	Medium	Low	Low
2-7	soil moisture (wet/Dry)	Dry	Dry	Dry	Dry	Dry	Dry
3	LOCUSTS						
3-1	present or A	A	A	P	P	A	A
3-2	area infested (ha)			5	3		
4	HOPPERS						
4-1	hopper stages (H123456F)						
4-2	appearance (solitary, transiens, gregarious)						
4-3	behaviour (isolated, scattered, groups)						
4-4	hopper density (/site or /m2)						
5	BANDS						
5-1	band stage (H12345F)						
5-2	band density (/m2 or Low Medium High)						
5-3	band sizes (m2 or ha)						
5-4	number of bands						
6	ADULTS						
6-1	maturity (immature, mature)			M	M		
6-2	appearance (solitary, transiens, gregarious)			S	S		
6-3	behaviour (isolated, scattered, groups)			I	I		
6-4	adult density (/transect or /ha)			3/ha	5/1000m ²		
6-5	breeding (copulating, laying)						
7	SWARMS						
7-1	maturity (immature, mature)						
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)						
7-6	flying (direction, time passing)						
7-7	flying height (Low Medium High)						
8	CONTROL						
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						
9	COMMENTS						

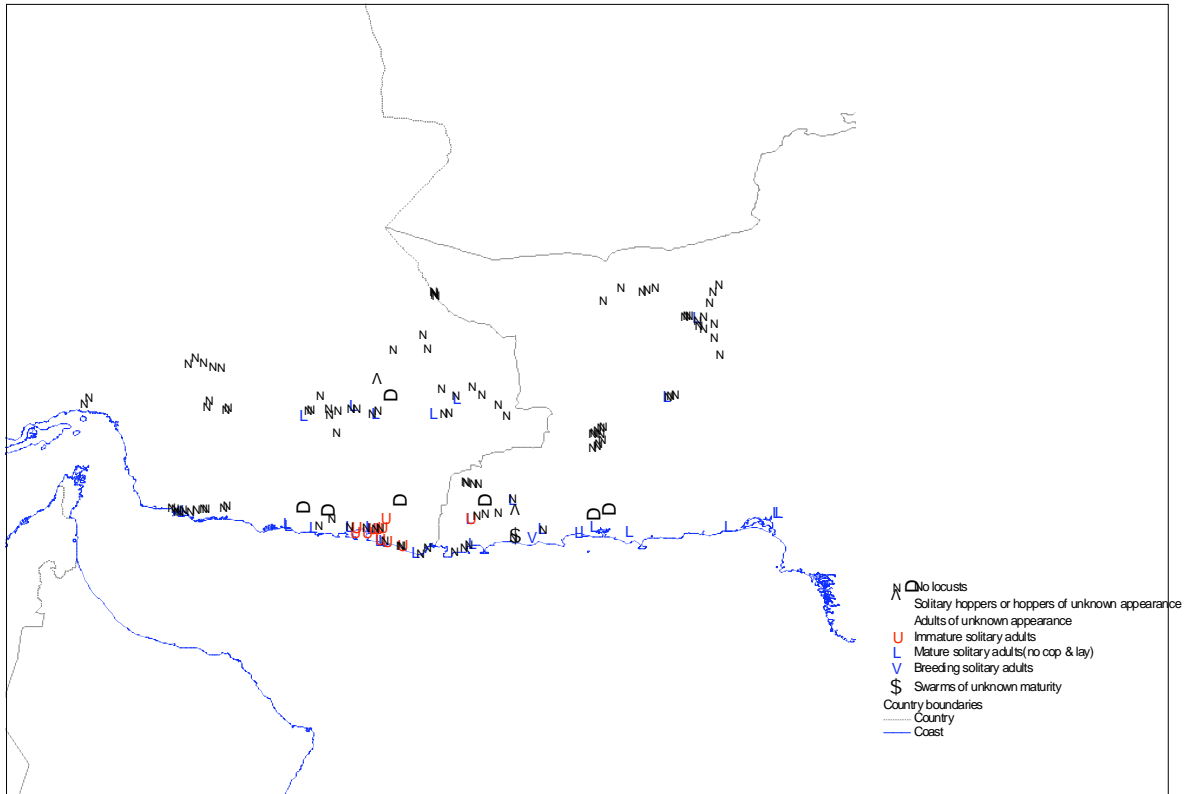
1	SURVEY STOP	1	2	3	4	5	6
1-1	date	25.4.07	27.4.07	27.4.07	27.4.07	27.4.07	27.4.07
1-2	name	Lafik	Roodshoor	Dehnow	Chahjazian	Chahdadkhoda	Saolan
1-3	latitude (N)	25.44.46	27,16,18	27,21,02	27,18,55	27,13,59	27,11,10
1-4	longitude (E or W)	57.44,00	56,28,10	56,31,56	58,17,15	58,15,53	58,32,05
2	ECOLOGY						
2-1	area (ha) of survey	50	200	100	100	20	100
2-2	habitat (wadi, plains, dunes, crops)	Beach	plains	Dunes	Dunes	Crops	Dunes
2-3	date of last rain	31,3,07	18,3,07	18,3,07	4,4,07	4,4,07	4,4,07
2-4	rain amount (mm or Low Moderate High)	Low	Low	Low	Low	Low	Low
2-5	vegetation (Dry, greening, green, Drying)	Green	Drying	Drying	Drying	Green	Drying
2-6	vegetation density (Low Medium Dense)	Low	Low	Low	Low	Dense	Low
2-7	soil moisture (wet/Dry)	Dry	Dry	Dry	Dry	Wet	Dry
3	LOCUSTS						
3-1	present or A	A	A	A	A	A	A
3-2	area infested (ha)						
4	HOPPERS						
4-1	hopper stages (H123456F)						
4-2	appearance (solitary, transiens, gregarious)						
4-3	behaviour (isolated, scattered, groups)						
4-4	hopper density (/site or /m2)						
5	BANDS						
5-1	band stage (H12345F)						
5-2	band density (/m2 or Low Medium High)						
5-3	band sizes (m2 or ha)						
5-4	number of bands						
6	ADULTS						
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)						
7	SWARMS						
7-1	maturity (immature, mature)						
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)						
7-6	flying (direction, time passing)						
7-7	flying height (Low Medium High)						
8	CONTROL						
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						
9	COMMENTS						

1	SURVEY STOP	1	2	3	4	5	6
1-1	date	27.4.07	28.4.07	28.4.07	28.4.07	28.4.07	28.4.07
1-2	name	Zehan	Chalpai	Nehzatabad	Sardi	Mirmeghdad	Boing
1-3	latitude (N)	27,12,49	27,51,32	27,56,21	27,52,10	27,49,34	27,48,13
1-4	longitude (E or W)	58.34,16	57,58,46	58,05,26	58,12,47	58,20,33	58,27,32
2	ECOLOGY						
2-1	area (ha) of survey	50	200	100	100	100	100
2-2	habitat (wadi, plains, dunes, crops)	plains	plains	Dunes	Dunes	Crops	Dunes
2-3	date of last rain	4,4,07	4,4,07	4,4,07	4,4,07	4,4,07	4,4,07
2-4	rain amount (mm or Low Moderate High)	Low	Low	Low	Low	Low	Low
2-5	vegetation (Dry, greening, green, Drying)	Drying	Drying	Drying	Drying	Green	Drying
2-6	vegetation density (Low Medium Dense)	Low	Low	Low	Low	Dense	Low
2-7	soil moisture (wet/Dry)	Dry	Dry	Dry	Dry	Wet	Dry
3	LOCUSTS						
3-1	present or A	A	A	A	A	A	A
3-2	area infested (ha)						
4	HOPPERS						
4-1	hopper stages (H123456F)						
4-2	appearance (solitary, transiens, gregarious)						
4-3	behaviour (isolated, scattered, groups)						
4-4	hopper density (/site or /m2)						
5	BANDS						
5-1	band stage (H12345F)						
5-2	band density (/m2 or Low Medium High)						
5-3	band sizes (m2 or ha)						
5-4	number of bands						
6	ADULTS						
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)						
7	SWARMS						
7-1	maturity (immature, mature)						
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)						
7-6	flying (direction, time passing)						
7-7	flying height (Low Medium High)						
8	CONTROL						
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						
9	COMMENTS						

1	SURVEY STOP	1	2	3	4	5	6
1-1	date	28,4,07	28,4,07	28,4,07	28,4,07		
1-2	name	Takhti	Gowrok	Chahali	Chahdanok		
1-3	latitude (N)	27,11,51	27,09,38	27,05,52	27,11,20		
1-4	longitude (E or W)	60,02,36	59,44,56	59,40,09	59,46,33		
2	ECOLOGY						
2-1	area (ha) of survey	100	100	120	100		
2-2	habitat (wadi, plains, dunes, crops)	Dunes	Dunes	Dunes	Dunes		
2-3	date of last rain	18,3,07	18,3,07	18,3,07	18,3,07		
2-4	rain amount (mm or Low Moderate High)	Low	Low	Low	Low		
2-5	vegetation (Dry, greening, green, Drying)	Dry	Drying	Dry	Dry		
2-6	vegetation density (Low Medium Dense)	Low	Low	Low	Low		
2-7	soil moisture (wet/Dry)	Dry	Dry	Dry	Dry		
3	LOCUSTS						
3-1	present or A	A	A	P	A		
3-2	area infested (ha)			2			
4	HOPPERS						
4-1	hopper stages (H123456F)						
4-2	appearance (solitary, transiens, gregarious)						
4-3	behaviour (isolated, scattered, groups)						
4-4	hopper density (/site or /m2)						
5	BANDS						
5-1	band stage (H12345F)						
5-2	band density (/m2 or Low Medium High)						
5-3	band sizes (m2 or ha)						
5-4	number of bands						
6	ADULTS						
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)			1/ha			
6-5	breeding (copulating, laying)						
7	SWARMS						
7-1	maturity (immature, mature)						
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)						
7-6	flying (direction, time passing)						
7-7	flying height (Low Medium High)						
8	CONTROL						
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						
9	COMMENTS						

Appendix 5. Map

Situation for desert locust between 01-Apr-2007 and 28-Apr-2007



Appendix 6. Joint Survey 2008 itinerary

Date	Route & area to survey	Overnight
1 Apr	Taftan, Nukkundi, Dalbandin	Dalbandin
2 Apr	Dalbandin, Chagai Hills, Nushki	Nushki
3 Apr	Kharan Area (Naru) and back	Kharan
4 Apr	Kharan Area (Shamsi) and back	Kharan
5 Apr	Kharan, Basima, Nag, Panjgur	Kharan
6 Apr	Panjgur, Prome and back	Panjgur
7 Apr	Panjgur, Hoshab, Turbat	Turbat
8 Apr	Turbat, Mand and back	Turbat
9 Apr	Turbat, Jiwani, Gwadar	Gwadar
10 Apr	Gwadar, Kulanch, Pasni	Pasni
11 Apr	Pasni area	Pasni
12 Apr	Pasni, Ormara, Uthal, Khuzdar	Khuzdar
13 Apr	Khuzdar, Quetta	Quetta
14 Apr	Rest day	Quetta
15 Apr	Prepare the 1st half report	Quetta
16 Apr	Quetta, Nushki, Taftan	Taftan
17 Apr	Cross Taftan to Mirjaveh; send 1st half report	Zahedan
18 Apr	Zahedan, Khash, Gosht, Saravan	Saravan
19 Apr	Saravan, Souran, Zaboli, Saravan	Saravan
20 Apr	Saravan, Khash, Iranshahr	Iranshahr
21 Apr	Iranshahr, Espakeh, Nikshahr, Chabahar	Chabahar
22 Apr	Chabahar, Beris, Sham, Govater, Chabahar	Chabahar
23 Apr	Chabahar, Vashnam, Dashtiari, Negur	Chabahar
24 Apr	Chabahar, Zar Abad, Jask, Jask area	Jask
25 Apr	Jask, Minab, Bandar Abbas	Bandar Abbas
26 Apr	Rest day	Bandar Abbas
27 Apr	Bandar Abbas, Kahnoj, Ghale Ganj, Sowlan, Kahnoj	Kahnoj
28 Apr	East Jaz Murian, Zeh Kalout, Dalgan, Jolgeh Chah Hashem, Iranshahr	Iranshahr
29 Apr	Iranshahr, Zahedan; prepare 2nd half report	Zahedan
30 Apr	Send final report	Zahedan
1 May	Meeting of technical experts in Mirjaveh; Pakistani team crosses at Mirjaveh/Taftan border	

Appendix 7. Photos



1. 272428N/621655E, Hoshak (I.R. Iran)



2. 270821N/613437E, Qader abad (I.R. Iran):
Desert Locust adults observed



3. 252718N/594853E, Bir (I.R. Iran): locust
fledgling on 24 April



4. 251328N/620900E, Kohjani (Pakistan)



5. 265021N/635411E, Dalkdap (Pakistan)



6. 270852N/614830E, Hushab hutomar (I.R.
Iran)



7. 255253N/624421E, Sulaika 1 (Pakistan)



8. 253736N/621317E, Zarinbog (Pakistan)



9. 272213N/650024E, Kasuk (Pakistan)



10. 285437N/643815E, Peshek (Pakistan):
survey team is safely checking soil moisture



11. 285831N/641900E, Kally valley dad
(Pakistan): survey form was also completed at
each stop



12. Panjgur to Turbat (Pakistan)



13. 275943N/654659E, Momaee (Pakistan): a field was surveyed beside some dunes



14. 271210N/602652E, Qalebampur (I.R. Iran)



15. I.R. Iranshahr to Espakeh (I.R. Iran)



16. Espakeh to Chabahar (I.R. Iran)



17. 252628N/604426E, Vashnam (I.R. Iran)