

***Third Desert Locust Joint Border Survey Report between Yemen &  
Saudi Arabia at Tihama Coastal Plain  
(Winter DL Breeding Areas)  
during 8 – 15 January,2005***

**INTRODUCTION:**

Continuing to the combined cooperation & increasing the good relationship between the two countries, concerning improving close monitoring the Desert Locust situation and its habitats at the border areas which being a good area to DL breeding & it's outbreak. This work comes from the important of conducting such survey between neighboring countries by encourage them from CRC & EMPRES. Therefore, FAO through EMPRES/CR and CRC aims to establish this type of joint surveys in CR.

The importance of joint border surveys is to monitor DL and habitats at the areas between borders, which are not including in the regular national survey programs in the neighboring countries and it can be one of the areas, which DL developed in it without any control of the concerning countries. In the case of Kingdom of Saudi Arabia (KSA) and Yemen this aspect was already discussed between the Ministries of Agriculture in the two countries where bilateral agreement was signed by the two countries on July 2002 and this type of surveys were discussed and agreed to be carried under

the responsibility of the concerning authorities. At the same time, this activity also included in the workplan of the EMPRES/CR for 2002 and funds needed allocated by EMPRES/CR.

The two countries agreed to continuing carry out third joint border survey during 8 – 15 January of this year after finishing from the preparation actions with different concerning authorities in the two countries.

four participants from each country were participating, in this survey transportation provided by each country with out crossing borders. Collaboration of other authorities (Immigration and border guards) was playing an important role in the success of the joint border survey.

Only in three locations adult locusts were reported during survey (one in Yemen at Al-Ghabrah (15 45 12 N/ 43 00 13 E) mature solitary adults with density 3 / 1000m x 4 m)

and the other two locations in Saudi Arabia at Al-Hadhrou 16 32 10N/ 42 53 33 E and south Al-Hadhrou 16 31 32 N/ 42 54 39 E , which immature solitary adults were recorded with densities ranging between 1/ 30 ha & 2 / 50 ha .

No locusts were seen at other areas

this is due to unfavorable conditions at these areas during the survey, but findings and experiences gained and proposal for regular border surveys between the two countries were acknowledged.

**OBJECTIVES:**

The main objectives of carrying joint border surveys between members affected countries in the Central Region can be summarized as follow:

- Monitoring DL in the empty areas between the two neighboring countries to avoid DL development without close monitoring during breeding seasons.
- Exchange experiences between DL staff in the concerning countries
- Raise awareness of the other concerning authorities on DL aspects i.e. immigration and border guards
- Protect crops cultivated near borders through carrying out joint control operations
- Establish joint border surveys as a regular activity between neighboring countries

**ARRANGEMENTS AND PREPARATIONS:**

Desert Locust Centers in the two countries were starting internal arrangements with other concerning Authorities since four months for the purpose to get permissions to cross borders and survey empty areas for the first time. There is different correspondence need to be prepared with the immigration authority, Ministry of Interior. In addition to get authorization from Ministry of Agriculture to provide equipment and funds needed. Communication with neighboring country took part of the time to agree on the timetable and program of the joint border survey. In general, from 3 to 4 months are needs to complete the arrangements and preparation.

**IMPLEMENTATION:**

After agreement between locust staff that they will participate in joint survey in the two countries the decision was undertaken to carryout the survey during 8 – 15 January,2005. The participants are as follows:

**I. Saudi Arabia Team:**

1. Mohamed Ali l-Harbi, Team leader
2. Adnan Sulaiman Khan DL Survey Officer

3. Mohammed Ali Al-Amari, DL Survey Officer
4. Marhoom Break Marhoom, Head of PPD in Jazan Region

## **II. Yemen Team:**

1. Adel Ibrahim Al-Shaibani, Team Leader, DL Information Officer
2. Maged Abdul Raheem Al-Kataberi, DL Survey Officer
3. Abdullrazaq Al-Hakimi, DL Officer in Haradh Area
4. Khalid Mohammed Khamis, DL Officer.

Three vehicles (one pick-up and two station wagon) used in Yemen parts, while three station wagon were used in Saudi Arabia parts.

On 8<sup>th</sup> January Saudi team arrived to the checkpoint at the border and met by Yemeni team and held short meeting to agree on the route of survey for the first day, which include areas between northern Midi (16 17 58 N – 42 50 22 E) up to Al-Jar area (16 00 11 N-42 56 38E). The team agreed to delay empty area to 13<sup>th</sup> Jan. for the purpose that the team will start survey that area from the Saudi side. Team spent the night at Hodiedah and next day continue to survey areas eastern & southern of Hodiedah. The reason to involve the team at these areas is to give them a good picture on the DL breeding areas at Tihama of Yemen and exchange the experience. On the third day team start to survey the areas located from north of Al-Zuhra to south of Al-Jar. On the fourth day (11<sup>th</sup> Jan.) the Yemeni Team crossed the border area to Saudi side. No survey was conducted on this day due to some delay at the checkpoint of Saudi part. On 12<sup>th</sup> Jan. the joint survey teams started to survey the areas located between south of Jazan and Al-Muwasm area. On 13<sup>th</sup> Jan. survey empty area at the border and estimate the situation of habitat, size and looking for DL.

Visiting other breeding areas outside the border is important for the two parties to have good background on DL breeding areas surroundings of the borders in neighboring country helps them in understanding development of DL situation at these areas as well. The participants were agreed to develop proposal and recommendations on how to put a sustainable policy to survey borders regularly and try to establish that with MoA in the two countries. Suggestions on future look for establishing the regular surveys on the empty area between borders will include in the recommendations section of this report. The detailed program of the joint border survey will be attached as Appendix 1.

## **Survey Methods:**

During joint border survey methods for surveying DL was used depending on the topography of locations and the situation of vegetation at DL breeding areas. The following methods were used in evaluation of DL and habitat situations as follow:

### **1. Foot transects:**

Each survey officer should walk about 200 – 300 meter at the survey site with the wind to his face. Locust adults should be counted in a two-meter or wider strip in front of the officer. The precise width will depend on the time of day and the specific habitat at the site, and should be noted by the officer. The total number of locusts counted and the length and width of the foot transect should be recorded on the survey form. For hoppers, at least ten samples should be inspected and the number of hoppers seen recorded. A sample could either be one square meter of ground or a bush. The officer should record the minimum and maximum number of hoppers seen in a single sample on the survey form or eLocust program; in other words, the range. Furthermore, the officer should note the presence or absence of locusts and their appearance, behavior, and maturity as well as the ecology at the survey site. If several officers conduct transects at the same location, the total number of locusts seen in the total length of transect should be recorded on the survey form (including those officers who did not see any locusts in their transect), assuming that the transect width is the same for each officer.

### **2. Vehicle transects:**

A vehicle transect should be made for at least one kilometer while driving slowly in low gear with the wind from behind. The officer should count the number of adults that fly up across the front of the vehicle.

Information were collected and recorded in FAO Survey and Control Form or eLocust program in field at locations. In the evenings or nights participants held discussion to discuss the results and findings for recommendations.

Participants took survey results in FAO Survey and Control Forms and eLocust program from Yemen and Saudi Arabia to transmit it to their HQ's and to DLIS after they reach to their HQ's 2 or 3 days after finishing survey.

## **FINDINGS:**

### **I. The areas located between Midi & Al-Jar:**

The survey results were indicated that no locusts were detected and the vegetations were drying at those areas.

### **II. The areas located between South of Al-Jar & Al-Qutay'a (eastern of Al-Hodaidah)**

Survey results were indicated that three DL solitary mature adults were recorded at one location named Al-Ghabra (15 45 12 N / 43 00 13 E) north of Al-Zuhra where the vegetation was drying. The vegetations were green at some locations and drying at the others, where the soil moisture was dry at all surveyed areas.

### **III. The areas located between south of Jazan (Abo Aresh) and Al-Muwasm – Saudi part:**

1-3 solitary immature adults were recorded at two places of Al-Hadhrour areas (16 32 17N/ 42 53 54E & 16 31 03N / 42 53 14E), where the vegetations at all surveyed areas were drying and the soil moisture was dry.

### **IV. The joint Border areas between the two Countries:**

The survey results were indicated that no locusts were recorded at joint border areas and the ecological conditions were unsuitable for DL breeding & outbreak due to dry vegetations and soil moisture at those areas.

### **V. Other Findings:**

1. Cooperation of the other authorities whom are working in the borders is very good when they informed in advance such as what happened during this survey. Small survey team helps in shorting time for cross borders and moving quickly during survey. Thanks for all security and border guards in the two countries.
2. It was found that vehicles when are not crossing borders made arrangements easier and saving time.
3. The borders areas contains three parts with different types of vegetation and topography. The first one is the coastal salty strip (from sea side to point (16 22 32N-42 49 26E), which is unfavorable for DL breeding, while the second part extent from point (16 22 32N-42 49 26E) to point (16 26 53N-43 01 31E). This part is the most important area for DL breeding and consist vegetation preferable for DL (*Pennisetum*, *Deptriguim* and *Acacia* trees) see Appendix 3. The third part is wadi Haradh, which consist of sands with some vegetation of *Deptriguim* and *Acacia* trees and Marekh and extend of mountain. Size of the all areas is around 15 0 square kilometers (5 km width and 30 Kilometers length). Details survey results in FAO forms Appendix 2.
4. Survey team find that is a good chance to survey DL breeding areas south and north the border areas to have a good understanding on the breeding areas in each country. Therefore, they visit DL breeding areas in Tehama Yemen up to southern Hodiedah (Beout Al-Bota) and Tehama Saudi Arabia from border up to Jazan. This visit strengthens knowledge of the participants from the two countries on nature of DL habitat at two sides.
5. Psion and GPS were used during survey by information Officers from Yemen and gain good experience on using these equipments. Therefore, some questions were raised on sending data through Codan HF Radio and the test was failed. This problem will be discussed with the expert to verify the problem and find the solution.

## **RECCOMENDATIONS:**

1. Monitoring rainfalls at the winter joint border areas and continuing exchange the information concerning rains especially, at the areas that received some outbreak of DL during the last winter season.
2. Continuing exchange the DL information and reports between the two countries.
3. It is recommend conducting at least two joint survey operations for the border DL winter breeding areas on the beginning and end of winter season.
4. Exchange the experiences and skills between the two countries to improve DL activities in order to become joint tasks in the future, with coordinating of EMPRSES and CRC.
5. Improve and strength the cooperation aspects concerning DL activities by join the professional staff of the two countries to involved with survey, control teams and training courses in both countries.
6. DL centers in the two countries should be arranging the next join border survey.
7. It recommends that DL centers in both countries should prepared and allocated sufficient and suitable vehicles to facilitate conducting such survey in good manner.

**AKNOWLEDGEMENT:**

The participants would like to express their thanks to the Ministries of Agriculture in Saudi Arabia and Yemen for their assistance and cooperation. Thanks also to The EMPRES/CR Program, CRC, DL Centers in two countries due to important contribution to made this joint implemented. The participants are also thank other authorities at border to their assistance and help in passing borders very smoothly.

## Appendix I

### Survey Participants

#### I. SAUDI ARABIA:

1. Mohamed Ali Al-Harbi, Team Leader, Adnan Sulaiman Khan & Mohammed Ali Al-Amari DL Survey Officers  
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#### II. YEMEN:

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**Appendix II****Program for the third Border Joint Survey between Yemen and Saudi Arabia at Red Sea Winter breeding areas During 08 – 15 January,2005**

<b>Date</b>	<b>Route</b>	<b>Overnight</b>
08/01/2005	<ul style="list-style-type: none"><li>• Meeting in Kidf Midi check point and discussing route</li><li>• Survey the areas located between Midi &amp; North of Al-Jar</li></ul>	Al-Hodaidah
09/01/2005	Survey the areas located eastern & Southern Parts of Al-Hodaidah	Al-Hodaidah
10/01/2005	Survey the areas located north Al-Zuhrah & south of Al-Jar	Haradh
11/01/2005	Traveling to Saudi Side	Jazan
12/01/2005	Survey the areas located south of Jazan (Abo Aresh – surrounding border areas of Saudi part )	Jazan
13/01/2005	Survey the joint border areas	Jazan
14/01/2005	Preparing draft of final report and survey findings	Haradh
15/01/2005	Participants left to their stations	



<b>1</b>	<b>SURVEY STOP</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
1-1	date	08/01/05	09/01/05	09/01/05	09/01/05	09/01/05	09/01/05
1-2	name	Al-Sadah	Al-Qutay'a	Al-Barhomeyah	Al-Anbarah	Al-Dumaineyah	Al-Butah
1-3	latitude (N)	16 17 20 N	14 54 08 N	14 54 10 N	14 53 17 N	14 52 04 N	14 41 17 N
1-4	longitude (E or W)	43 04 46 E	43 11 20 E	43 09 53 E	43 10 30 E	43 11 08 E	43 10 53 E
<b>2</b>	<b>ECOLOGY</b>						
2-1	area (ha) of survey	50 ha	100 ha	80 ha	40 ha	20 ha	50 ha
2-2	habitat (wadi, plains, dunes, crops)	Crops	Plains	Crops	Crops	Plains	Plains
2-3	date of last rain	2 months ago	3 Months ago	3 Months ago	3 Months ago	3 Months ago	3 Months ago
2-4	rain amount (mm, Low Moderate High, ?)	L	M	M	M	M	M
2-5	vegetation (dry, greening, green, drying)	Green	Drying	Drying	Drying	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
<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, /m2, Low Med High)						
<b>5</b>	<b>BANDS</b>						
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						
<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, /ha, L M H)						
6-5	breeding (copulating, laying)						
<b>7</b>	<b>SWARMS</b>						
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)						
<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>						

kc 99.03

Was a GPS used to determine locations? Yes

Is a brief interpretation or analysis of the results included?

Country : Yemen

Locust Officer :

JS Team

date : 09/01/05

cleared by :

JS Team

date : 15/01/05

1	SURVEY STOP	1	2	3	4	5	6
1-1	date	09/01/05	10/01/05	10/01/05	10/01/05	10/01/05	10/01/05
1-2	name	Al-Butah.1	Al-Ghabrah	Sha'ab Ashwel	Bani ahmed	Al-Masoudeyah	Al-Mukasarah
1-3	latitude (N)	14 42 02 N	15 45 12 N	15 48 10 N	15 51 15 N	15 54 02 N	15 54 49 N
1-4	longitude (E or W)	43 13 00 E	43 00 13 E	42 59 45 E	43 00 39 E	42 59 36 E	42 58 24 E
2	<b>ECOLOGY</b>						
2-1	area (ha) of survey	50 ha	40 ha	100 ha	100 ha	50 ha	50 ha
2-2	habitat (wadi, plains, dunes, crops)	Plains	Plains	Plains	Plains	Plains	Plains
2-3	date of last rain	3 Months ago	3 Months ago	2 Months ago	3 Months ago	3 Months ago	3 Months ago
2-4	rain amount (mm, Low Moderate High, ?)	M	L	M	L	L	L
2-5	vegetation (dry, greening, green, drying)	Drying	Drying	Green	Drying	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	P	A	A	A	A
3-2	area infested (ha)						
4	<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, /m2, Low Med High)						
5	<b>BANDS</b>						
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	<b>ADULTS</b>						
6-1	maturity (immature, mature)		Mature				
6-2	appearance (solitary, transiens, gregarious)		Solitary				
6-3	behaviour (isolated, scattered, groups)		S				
6-4	adult density (/transect, /ha, L M H)		3/1000 x 4				
6-5	breeding (copulating, laying)						
7	<b>SWARMS</b>						
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	<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						
9	<b>COMMENTS</b>						

kc 99.03

Was a GPS used to determine locations? Yes

Is a brief interpretation or analysis of the results included?

Country : Yemen

Locust Officer :

JS Team

date : 10/01/05

cleared by :

JS Team

date : 15/01/05

1	<b>SURVEY STOP</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
1-1	date	10/01/05	10/01/05	10/01/05	11/01/05	12/01/05	12/01/05
1-2	name	Bani Keladah	Bani Al-Khal	Al-Jar	Al-Khalaweyah	Al-Hadhrour	South Al-Hadhrour
1-3	latitude (N)	15 55 49 N	15 57 47 N	16 00 11 N	17 27 25 N	16 32 10 N	16 31 32 N
1-4	longitude (E or W)	42 55 23 E	42 55 37 E	42 56 38 E	42 28 24 E	42 53 33 E	42 54 39 E
2	<b>ECOLOGY</b>						
2-1	area (ha) of survey	100 ha	50 ha	50 ha	50 ha	30 ha	50 ha
2-2	habitat (wadi, plains, dunes, crops)	Plains	Plains	Plains	Plains	Crops	Crops
2-3	date of last rain	2 months ago	2 Months ago	3 Months ago	3 Months ago	3 Months ago	3 Months ago
2-4	rain amount (mm, Low Moderate High, ?)	M	L	L	M	M	M
2-5	vegetation (dry, greening, green, drying)	Green	Drying	Dryi	Drying	Drying	Drying
2-6	vegetation density (Low Medium Dense)	M	M	M	M	L	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	P	P
3-2	area infested (ha)						
4	<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, /m2, Low Med High)						
5	<b>BANDS</b>						
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	<b>ADULTS</b>						
6-1	maturity (immature, mature)					Immature	Immature
6-2	appearance (solitary, transiens, gregarious)					Solitary	Solitary
6-3	behaviour (isolated, scattered, groups)					I	Scattered
6-4	adult density (/transect, /ha, L M H)					1/ site	2 / site
6-5	breeding (copulating, laying)						
7	<b>SWARMS</b>						
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	<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						
9	<b>COMMENTS</b>						

kc 99.03

Was a GPS used to determine locations? Yes

Is a brief interpretation or analysis of the results included?

Country : Yemen + Saudi Arabia

Locust Officer :

JS Team

date : 12/01/05

cleared by :

JS Team

date : 15/01/05

<b>1</b>	<b>SURVEY STOP</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
1-1	date	12/01/05	12/01/05	12/01/05	12/01/05	12/01/05	13/01/05
1-2	name	South Al-Tewal	Al-Hafeyah	Al-Ganbour	West Al-Ganbour	Al-Argain	Border Area
1-3	latitude (N)	16 30 09 N	16 25 32 N	16 25 03 N	16 24 45 N	16 24 21 N	16 23 19 N
1-4	longitude (E or W)	42 55 53 E	42 56 06 E	42 53 59 E	42 53 15 E	42 52 07 E	42 49 42 E
<b>2</b>	<b>ECOLOGY</b>						
2-1	area (ha) of survey	100 ha	50 ha	20 ha	30 ha	50 ha	50 ha
2-2	habitat (wadi, plains, dunes, crops)	Plains	Plains	Plains	Crops	Plains	Plains
2-3	date of last rain	3-4 months ago	3-4 Months ago	3-4 Months ago	3-4 Months ago	3-4 Months ago	3-4 Months ago
2-4	rain amount (mm, Low Moderate High, ?)	L	L	L	L	L	L
2-5	vegetation (dry, greening, green, drying)	Dry	Dry	Dry	Drying	Drying	Dry
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
<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, /m2, Low Med High)						
<b>5</b>	<b>BANDS</b>						
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						
<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, /ha, L M H)						
6-5	breeding (copulating, laying)						
<b>7</b>	<b>SWARMS</b>						
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)						
<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>						

lc 99.03

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JS Team

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<b>1 SURVEY STOP</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
1-1	date	13/01/05	13/01/05	13/01/05	13/01/05	13/01/05	13/01/05
1-2	name	Border Area.1	Border Area.2	Border Area.3	Border Area.4	Border Area.5	Border Area.6
1-3	latitude (N)	16 22 36 N	16 23 36 N	16 23 44 N	16 24 36 N	16 25 45 N	16 28 49 N
1-4	longitude (E or W)	42 52 28 E	42 54 50 E	42 55 23 E	42 56 06 E	42 56 42 E	42 56 30 E
<b>2 ECOLOGY</b>							
2-1	area (ha) of survey	50 ha	100 ha	50 ha	30 ha	50 ha	100 ha
2-2	habitat (wadi, plains, dunes, crops)	Plains	Plains	Plains	Plains	Plains	Plains
2-3	date of last rain	3-4 months ago	3-4 Months ago	3-4 Months ago	3-4 Months ago	3-4 Months ago	3-4 Months ago
2-4	rain amount (mm, Low Moderate High, ?)	L	L	L	L	L	L
2-5	vegetation (dry, greening, green, drying)	Dry	Dry	Dry	Dry	Dry	Dry
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
<b>3 LOCUSTS</b>							
3-1	present or absent	A	A	A	A	A	A
3-2	area infested (ha)						
<b>4 HOPPERS</b>							
4-1	hopper stages (H123456F)						
4-2	appearance (solitary, transiens, gregarious)						
4-3	behaviour (isolated, scattered, groups)						
4-4	hopper density (/site, /m2, Low Med High)						
<b>5 BANDS</b>							
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						
<b>6 ADULTS</b>							
6-1	maturity (immature, mature)						
6-2	appearance (solitary, transiens, gregarious)						
6-3	behaviour (isolated, scattered, groups)						
6-4	adult density (/transect, /ha, L M H)						
6-5	breeding (copulating, laying)						
<b>7 SWARMS</b>							
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)						
<b>8 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 COMMENTS</b>							

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<b>1</b>	<b>SURVEY STOP</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
1-1	date	13/01/05	13/01/05	13/01/05			
1-2	name	Border Area.7	Al-Mahamel	W.Rabah			
1-3	latitude (N)	16 30 29 N	16 47 14 N	16 49 39 N			
1-4	longitude (E or W)	42 57 56 E	42 55 24 E	42 54 57 E			
<b>2</b>	<b>ECOLOGY</b>						
2-1	area (ha) of survey	50 ha	50 ha	50 ha			
2-2	habitat (wadi, plains, dunes, crops)	Plains	Plains	Plains			
2-3	date of last rain	3-4 months ago	3-4 Months ago	3-4 Months ago			
2-4	rain amount (mm, Low Moderate High, ?)	L	L	L			
2-5	vegetation (dry, greening, green, drying)	Dry	Drying	Drying			
2-6	vegetation density (Low Medium Dense)	M	M	M			
2-7	soil moisture (wet/dry)	D	D	D			
<b>3</b>	<b>LOCUSTS</b>						
3-1	present or absent	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, /m2, Low Med High)						
<b>5</b>	<b>BANDS</b>						
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						
<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, /ha, L M H)						
6-5	breeding (copulating, laying)						
<b>7</b>	<b>SWARMS</b>						
7-1	maturity (immature, mature)						
7-2	swarm density (/m2 or Low Medium High)						
7-3	swarm size (km2 or ha)						
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