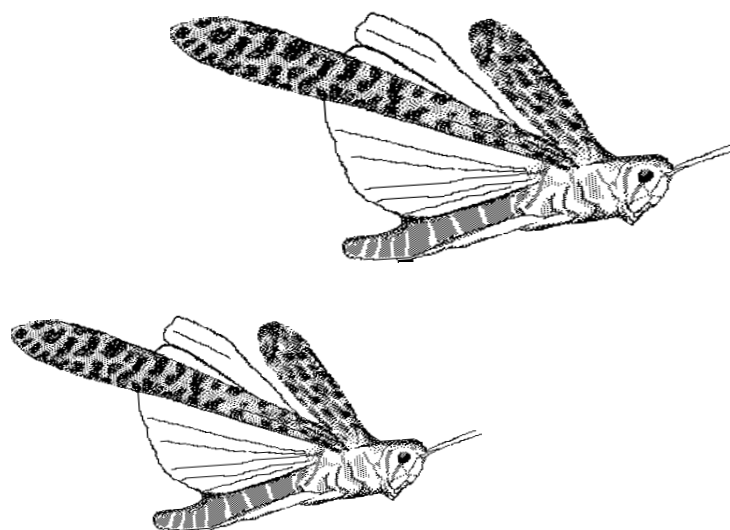


Joint Border Survey of the Spring Breeding Areas of the Desert Locust in Baluchistan of the I.R. Iran and Pakistan

April - May 1996



FOOD AND AGRICULTURE ORGANIZATION
OF THE UNITED NATIONS

Rome, 1996



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

April - May 1996

by

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

Rome, June 1996

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PREFACE

During the 1960s and 1970s, joint surveys were regularly organized to check the spring breeding areas of Baluchistan in Iran and Pakistan. These surveys were stopped after the mid 70s until last year when FAO organized a joint survey along the border areas of both countries. This year, FAO in collaboration with the Governments of Pakistan and the Islamic Republic of Iran organized a second joint survey. The survey was financed from member country contributions to the Trust Fund of the FAO Commission for Controlling the Desert Locust in South-West Asia.

The survey this year represents a continuation of an important activity which hopefully will occur on an annual basis. The results of such a survey are very useful. It can provide countries in the Region with an idea of the potential scale of any locust movement from the spring breeding areas of Iran and Pakistan eastwards to the summer areas along the Indo-Pakistan border. From this, plans can be made in advance for survey and control operations that are more cost-effective, minimize pesticide usage and avert crop losses.

FAO firmly believes that this joint survey is a fine example of the type of cooperation that can be achieved between locust affected countries, facilitated by FAO, as part of the early warning efforts against the Desert Locust.

FAO would like to express its sincere gratitude to the Governments of the host countries and to the members and support staff of the survey team.

Mohamed S. Zehni
Director
Plant Production and Protection Division

SUMMARY OF FINDINGS AND RECOMMENDATIONS

1. A joint Desert Locust survey was carried out in the Baluchistan region of eastern Iran and western Pakistan from 10 April to 10 May 1996. A team composed of two locust officers from each country and one expert from FAO covered a total of 7,500 km during one month, spending about equal time in each country. The survey was undertaken based on a recommendation by the FAO Commission for Controlling the Desert Locust in South-West Asia which emphasizes that such surveys should occur on an annual basis. It was funded jointly by the Commission and FAO EMPRES.
2. Above average rains fell throughout Baluchistan this year although most of the rains started and ended earlier than usual. As a result, vegetation was green from December to early March in northern interior Baluchistan and from January to early April in coastal areas. Vegetation was nearly dry in all areas seen during the joint survey and conditions were not favourable for additional breeding. However, rainfall was sufficient to allow breeding in November and December in the Kharan Valley of Pakistan and from February to April in Iran near Iranshahr and on the coastal plains near Chabahar and Jask and to a lesser extent in the Dasht River Valley of Pakistan.
3. As a result of the good rains and subsequent breeding, many more locusts were seen this year during the survey than last year. The most important locust population seen during the survey was on the Vashnum Plains near Chabahar in Iran where hoppers were in the process of grouping and forming bands. Control was subsequently carried out in this area. Other important infestations were present in the Kharan and Dasht River Valleys of Pakistan and near Jask and Iranshahr in Iran. Gregarious and transiens adults were present in the Dasht River Valley, transiens and solitary adults were seen near Iranshahr and Chabahar, solitary and transiens hoppers were present on the coastal plains east of Jask, and solitary adults were scattered throughout the Kharan Valley. Locusts were concentrating in the small areas of vegetation that were still green. As a result, hoppers and adults were changing from the solitary phase to transiens and a few to gregarious.
4. There is a possibility that a few more groups and perhaps a swarmlet or two could form in the coming weeks in a few areas of Baluchistan as vegetation continues to dry. No further breeding is likely to occur in Baluchistan this spring. Moderate numbers of adults are expected to move east towards the summer breeding areas along the Indo-Pakistan border during June and lay eggs with the start of the monsoon rains. The scale of the movement will be larger than last year.
5. It is strongly recommended that any infestations found in the coming weeks that are gregarizing in Baluchistan be controlled to reduce the size of the movement towards the Indo-Pakistan summer breeding areas. Furthermore, the situation requires careful monitoring in the Shooli and Kharan areas of Pakistan and on the coastal plains of Iran as well as in the Iranshahr area.
6. It is recommended that locust survey results and meteorological data collected by agricultural offices in Baluchistan of Iran be sent to Tehran by facsimile on a regular and timely basis. This information is important to planning and forecasting in both countries and for FAO.
7. Steps should be taken to insure that the I.R. Iran has the necessary capacity for survey and limited ULV control in the Chabahar area each spring during the breeding period.
8. The joint survey should be repeated again in the spring of 1997. The report contains specific recommendations including a suggested itinerary.

ACKNOWLEDGMENTS

The authors would like to express their sincere gratitude to the generous assistance and support provided by the Governments of the I.R. Iran and Pakistan, the Plant Protection Departments of both countries, the FAO Representation in Islamabad, and especially the FAO Representation in Tehran. The drivers and assistants that accompanied the team should also be thanked for their tireless efforts throughout the survey.

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

April - May 1996

INTRODUCTION

Baluchistan extends over a large area of eastern Iran and western Pakistan (Fig. 1). In the south, it consists of a long sandy coastal plain bordering the Gulf of Oman and the Arabian Sea. In the interior, there are numerous sandy and semi-sandy valleys separated by several rocky and barren mountain ranges. There are two large interior desert areas, the Juz Murian in Iran and the Baluchistan Desert in Pakistan, both surrounded by mountains.

If enough rains fall, favourable conditions for Desert Locust breeding can develop in the many sandy areas of these places. Rains fall mostly during the winter and spring in Baluchistan. During recession periods, breeding is often confined to a few areas along the coastal plains of Iran (Chabahar and Zarabad) and Pakistan (Pasni), in sub-coastal areas such as the Dasht River Valley near Turbat (Pakistan), and in interior valleys of Pakistan such as Kharan and Nushki, near Bampur and to a lesser extent near Saravan in Iran. Breeding usually occurs from March to May in coastal areas and from April to June in the interior.

Unusually heavy rains fell during the winter of 1995-96 in many parts of Baluchistan (Fig. 2). Rainfall was not only higher this year in all areas compared to last year but it was above the long term average. However, the quantity, distribution and timeliness of these rains varied. In general, the rains started and stopped earlier than normal this year. More rain fell in the northern parts of the interior of western Pakistan than in the central interior. Rains stopped very early in some coastal areas of Pakistan, for example Gwadar and Pasni did not receive any rainfall after January. The rains failed in most all areas in February. As a result, a wide range of breeding conditions was expected throughout Baluchistan.

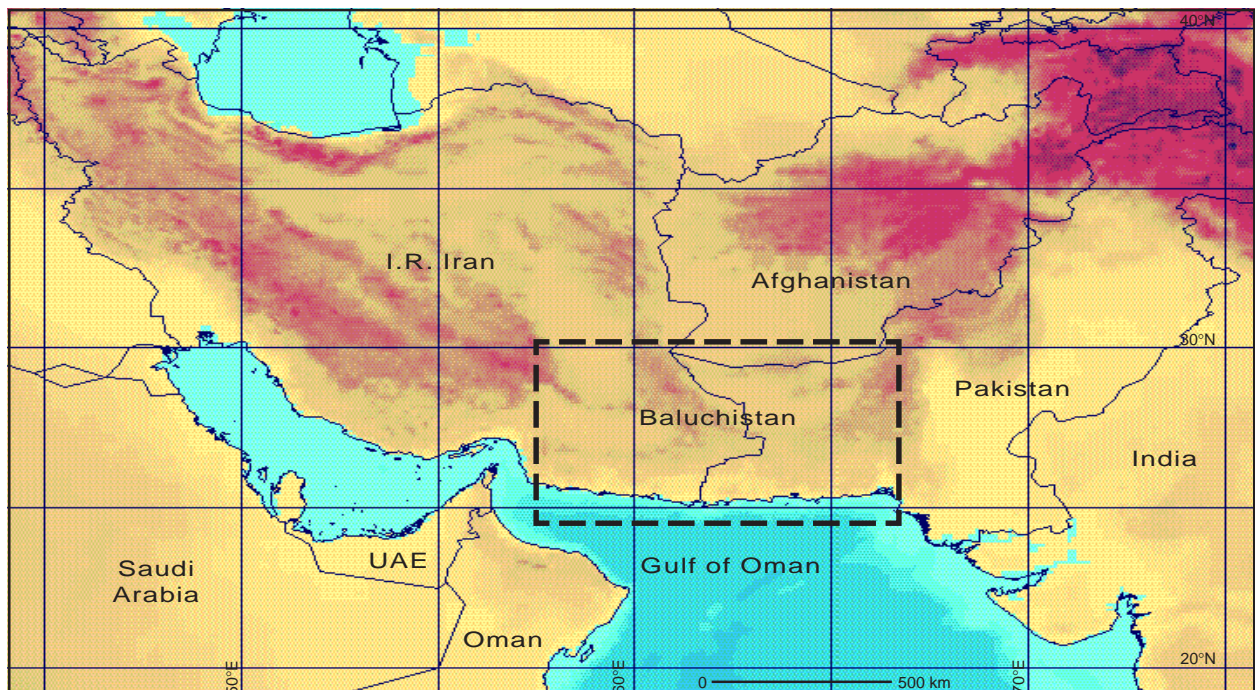


Figure 1. Baluchistan region of the I.R. Iran and Pakistan.

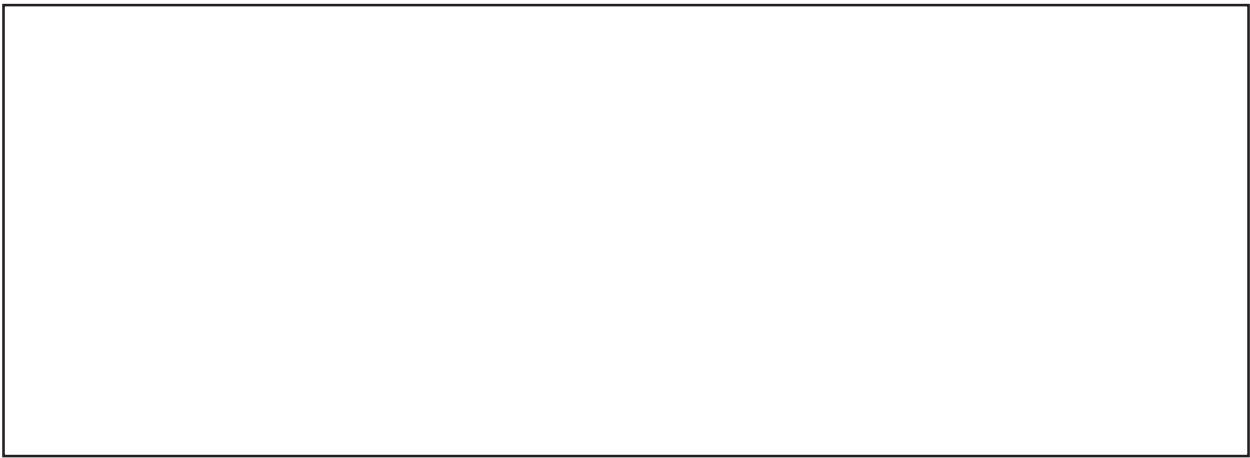


Figure 2. Rainfall received in Baluchistan from December 1995 to April 1996.

Only low and insignificant numbers of locust adults were reported from Baluchistan during the winter of 1995-96 (Fig. 3). In Iran, locusts were reported on the coast near Chabahar and Zarabad in November and January. In Pakistan, solitary adults were reported throughout the winter from December to March at several places in the interior and on the coast. Breeding was reported east of Chabahar in January and near Kharan in December. The latter is rather unusual and was probably a result of adults that moved from the summer breeding areas along the Indo-Pakistan border in the autumn of 1995 and bred after rainfall in late November and early December near Kharan. The resulting patches of high density hoppers and new adults required control on 9 December on 500 ha. No further breeding was reported from Baluchistan.

The purpose of this year's survey was to assess the current locust situation including breeding conditions in Baluchistan in order to determine the potential threat to neighboring countries in the coming months. The survey checked coastal and interior areas on both sides of the border which are not regularly surveyed by national teams, especially those in Iran.

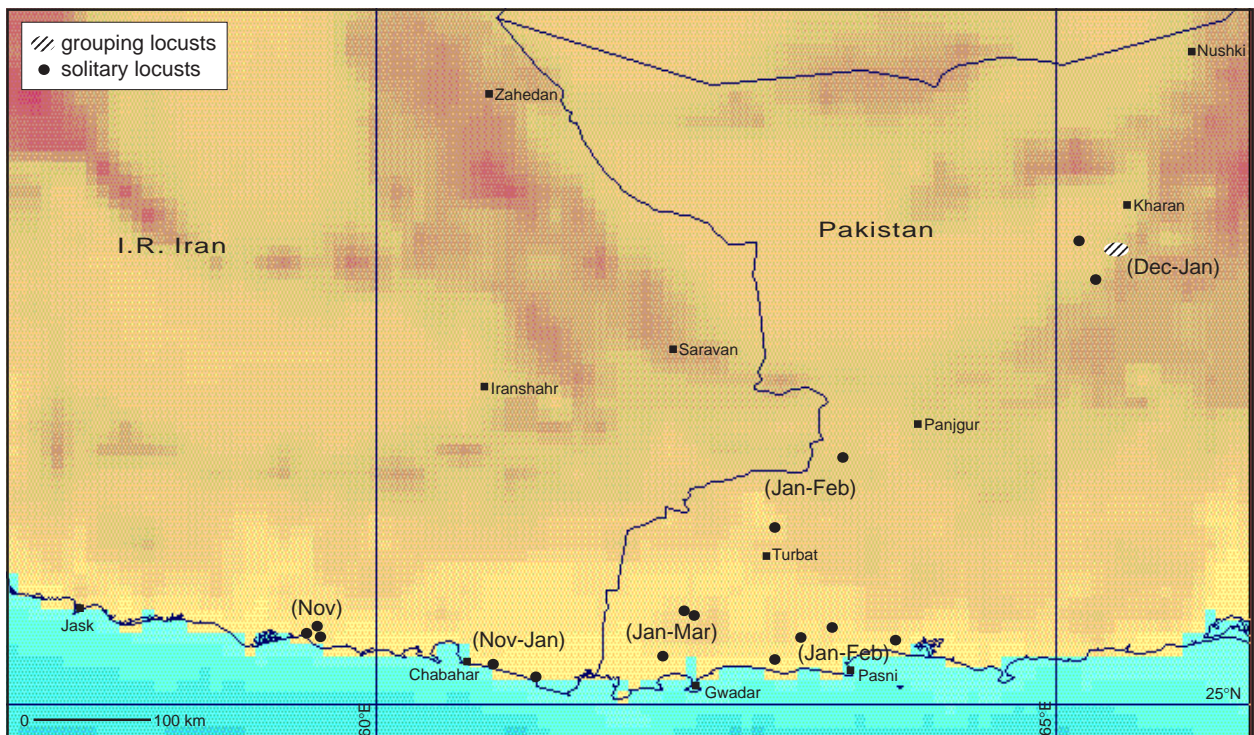


Figure 3. Locust infestations in Baluchistan during the winter 1995-96.

METHODOLOGY

The survey team consisted of two locust officers from Iran and two from Pakistan plus a locust officer from FAO Headquarters (Appendix 1). An assistant was provided by Pakistan to help with cooking and other arrangements. The team usually spent the nights at Government rest houses. Four 4WD vehicles with drivers were provided by each country for the portion of the survey carried out in their own country. To minimize the time and arrangements required to cross the border, only the locust officers and the assistant crossed the border at Mirjaveh / Taftan.

The FAO Locust Officer and the Iranian team flew to Zahedan on 12 April and crossed the border at Mirjaveh the following day to meet the Pakistani team in Taftan. The teams surveyed the Baluchistan region of western Pakistan until 25 April and then crossed from Taftan to Mirjaveh to survey the adjacent areas of Iran from 26 April to 6 May. Mr. Cressman flew from Chabahar to Tehran on 6 May and then on to Rome on the 7th. The Pakistani team returned to Pakistan via Mirjaveh / Taftan on the 8th (Appendix 2).

During the survey, the team used the methodology recommended in the *FAO Desert Locust Guidelines* to check the areas for recent rainfall, vegetation and locusts. This consisted of stopping in areas of green vegetation, making foot transects of 100-300 or more meters and recording the number of locusts seen on the standard *FAO Desert Locust Survey Form*. Details of locust maturity and behaviour were also recorded as well as soil and vegetation conditions. In larger areas of green vegetation, vehicle transects of about one kilometer were made. Whenever possible, local plant protection officers were asked to help locate areas of green vegetation and locusts. District locust officers met the team as it entered each district in Pakistan. Farmers, nomads and villagers were also interviewed about recent rainfall, places of green vegetation and the presence of locust populations. A hand-held global positioning system (GPS) was used in combination with maps and compass to determine the precise location of the survey stops and route. Temperature and relative humidity data were collected at each survey stop using a whirling hygrometer. From this information, the team could obtain the best possible understanding of the current and past locust and ecological situation.

RESULTS AND DISCUSSION

For purposes of this report, it is useful to divide Baluchistan into three main and fairly distinct geographical areas. Appendix 3-6 contains details of the observations made and information collected during the survey.

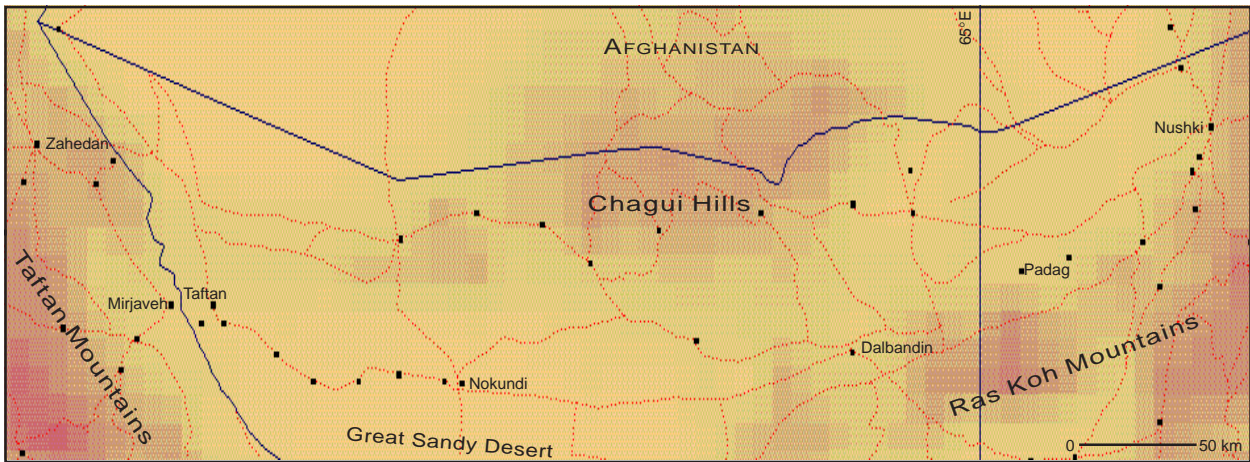


Figure 4. Locust infestations seen in the northern areas of Baluchistan extending from Zahedan in Iran to Nushki in Pakistan during the joint survey.

(a) Northern Baluchistan

Ecology

The northern part of Baluchistan can be roughly defined as that area north of the Taftan Mountains in Iran and the Ras Koh Mountains in Pakistan to the Chagui Hills on the Afghanistan border. It consists primarily of high elevation sandy and rocky plains that extend unbroken from Zahedan in Iran to Nushki in Pakistan. The plains from Zahedan to Nokundi were extremely dry and nearly devoid of vegetation due to a lack of rainfall. Short annual grass first appeared covering the plains about 70 km east of Nokundi and continued as far as the eye could see for about 200 km. Vegetation was also present in the interdunal areas after Dalbandin. This was the result of good rains that fell over a widespread area during the first half of March. However as no significant rainfall has occurred since then, the grasses were starting to dry out in all places. A few irrigated and rainfed plots of wheat, cumin and onions were seen on the edge of Dalbandin and in several areas between Padag and Nushki as well as south-west of Nushki. Extensive wheat farms were situated on the Iranian side of the border for about 60 km south of Mirjaveh.

Nushki received more than twice the amount of rainfall this year compared to last year (Fig. 5). This was well above the long-term average. However, the rainfall was not evenly distributed from November to April. The majority of the rain fell during the first three weeks of December followed by moderate rains in late January and one day of heavy rainfall (76 mm) on 4 March. Light snow fell on 14 January. Temperatures began to gradually warm up in mid March and by early April, they were rapidly increasing.

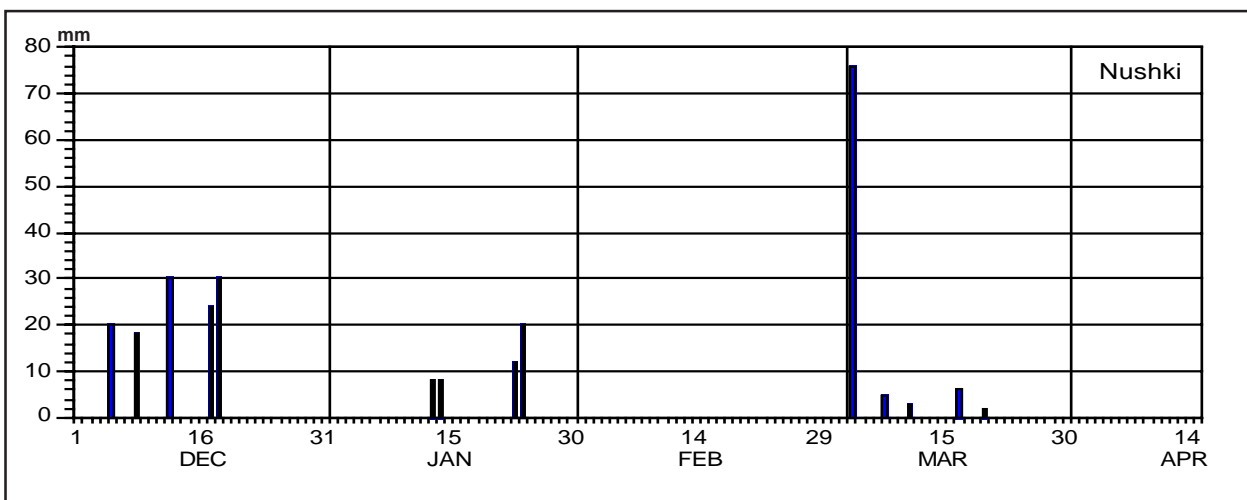


Figure 5. Rainfall in northern Baluchistan, December 1995 to April 1996.

Locusts

No significant locust infestations have been reported this year nor were seen during the survey. Isolated mature solitary adults were seen at two places in wheat plots (Fig. 4). Similar numbers were reported from one location north-west of Nushki on the Afghanistan border.

Due to the widespread nature of the rainfall this year, there is a moderate risk of low numbers of mature adults concentrating and breeding in irrigated cropping areas during May after the natural vegetation dries out. If these adults lay eggs and the hoppers hatch, the new adults that form are expected to move towards the summer breeding areas along the Indo-Pakistan border in the early summer. However, no significant developments are expected.

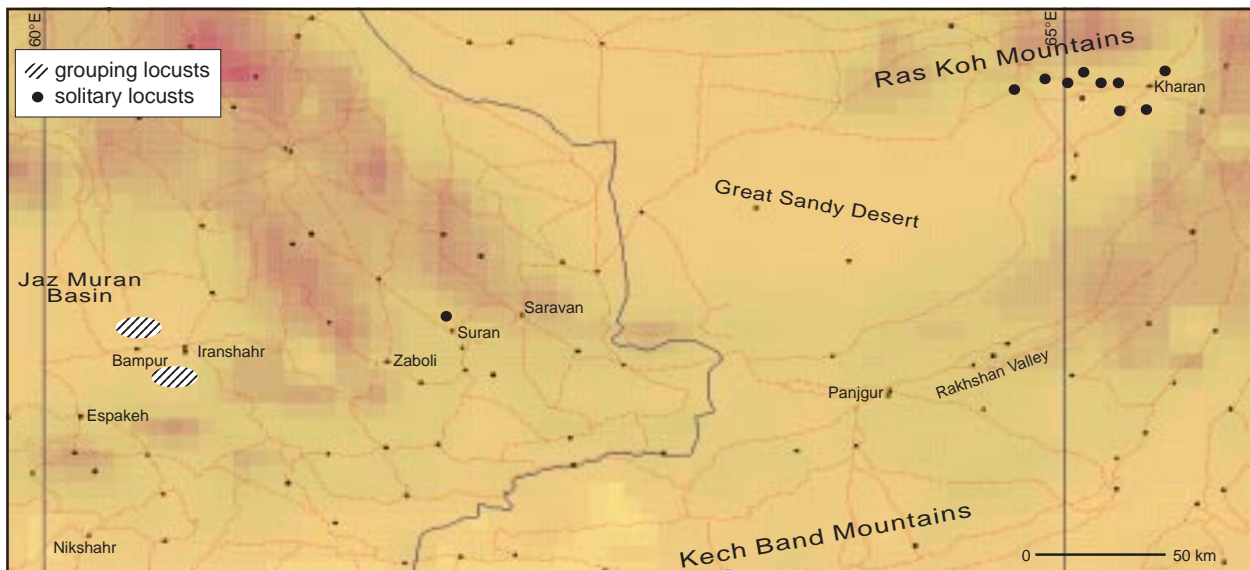


Figure 6. Locust infestations seen in the central area of Baluchistan in Iran and Pakistan during the joint survey.

(b) Central Baluchistan

Ecology

Central Baluchistan can be defined as extending from south of the above area to the Kech Band Mountains north of Turbat (Fig. 6). It consists of several separate valleys which are, from north to south, Kharan Valley and Rakhshan Valley in Pakistan which extends west into Saravan, Suran and Zaboli Valleys in Iran. In the Kharan Valley, most of the sandy plains and low dunes in a 25 km radius to the south and west of Kharan town were covered with annual vegetation that was starting to dry out. Similar vegetation conditions were seen up to 50 km east of Kharan. This suggests that the rains that fell earlier in the year allowed vegetation to remain green up to mid March. Vegetation was dry or nearly dry further west towards the Great Sandy Desert and south to the upper Rakhshan Valley, in the Saravan, Suran and Zaboli Valleys, and in the eastern portion of the Jaz Muran Basin.

Above average rains fell this year in Kharan, Panjgur and Saravan (Fig. 7). This year Kharan and Panjgur received eight times the rainfall of last year. The rains in Panjgur were said to be the heaviest in the past 40 years. The distribution of rains during the season was good in Kharan and Saravan with rains falling throughout December, January and February but decreased somewhat in March. Rains stopped by late March. Good rainfall was received in Panjgur in December, however very little rain fell during February and only light rains fell in March. No rains fell in Kharan and Panjgur during the first half of April. Light snowfall occurred in Kharan on 12 January. Temperatures began to gradually warm up in mid March and by early April they were rapidly increasing.

Locusts

Breeding occurred during November south of Kharan which warranted control on 9 December against 500 ha of high concentrations of late instar hoppers and new adults. This was unusual as breeding rarely occurs in this area so early in the winter. As a result of the good rains this year and the lack of surveys (apart from a special survey conducted during the first half of January) until April, undetected breeding probably occurred at other places in the Kharan Valley and surrounding areas which may have produced adults from January to March. During the joint survey, isolated mature adults were found at several places south and west of Kharan and other adults were seen while driving east of Kharan (Fig. 6). Higher numbers of mature adults, some showing transiens characteristics, and a few late instar solitary hoppers were seen in the eastern Jaz Muran Basin near Bampur indicating that breeding occurred about February or March. A few isolated adults were seen in the Suran Valley.

Adult maturation occurred earlier than normal this year in the Kharan Valley as a result of good winter rains and warm temperatures. Further breeding is unlikely to occur in central Baluchistan due to the prevailing dry conditions. Adults in the Kharan Valley and eastern Jaz Muran will probably concentrate and then move east towards the Indo-Pakistan summer breeding areas, or some may simply die off.

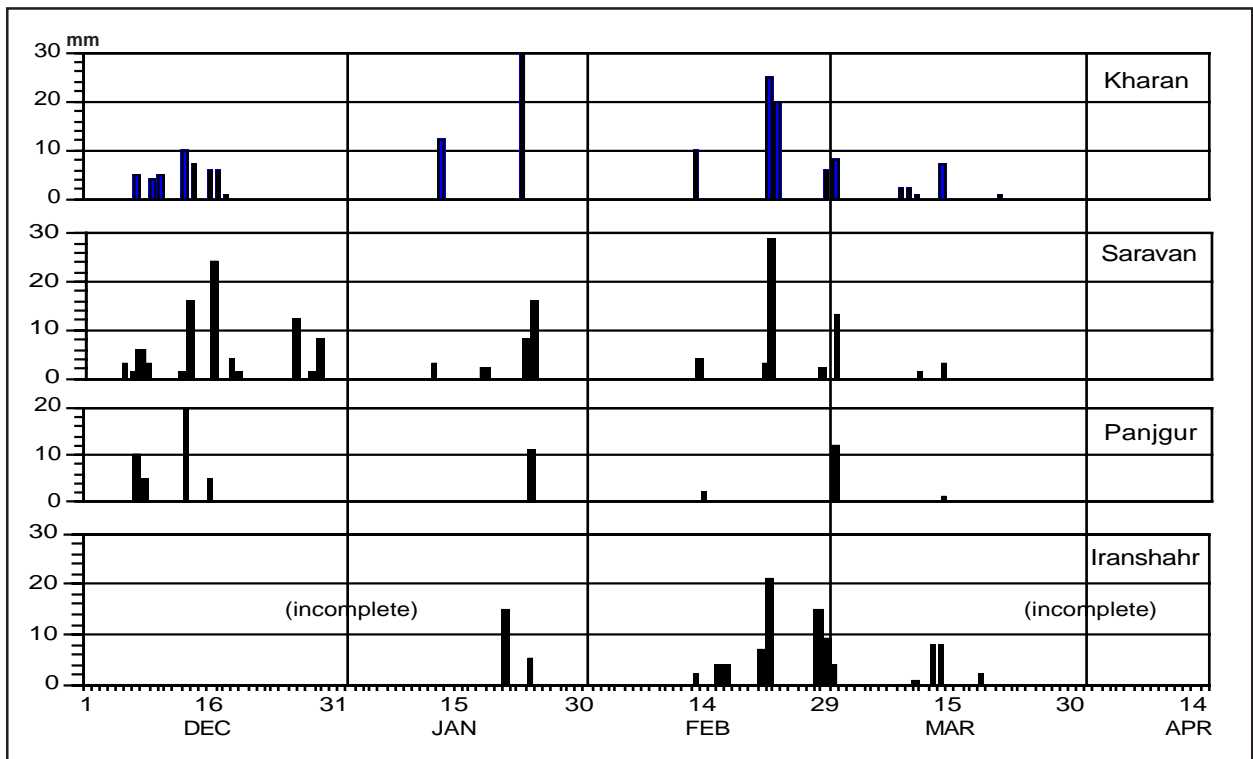


Figure 7. Rainfall in central Baluchistan, December 1995 to April 1996.

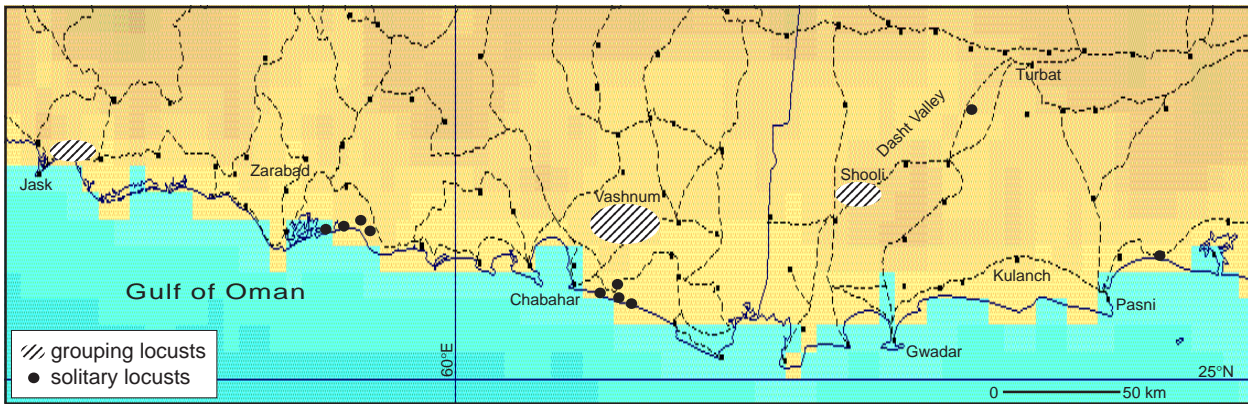


Figure 8. Locust infestations seen on the coast and in adjacent interior areas of southern Baluchistan in Iran and Pakistan during the joint survey.

(c) Southern Baluchistan

Ecology

Southern Baluchistan consists of the coastal plains extending from Jask to east of Pasni in Pakistan as well as sub-coastal areas such as the Dashtiari, Dasht and Kech Valleys (Fig. 8). It contains some of the best and most frequent breeding areas in Baluchistan. In Pakistan, no annual vegetation was seen in the Kech Valley east of Turbat. Vegetation in the Dasht Valley was drying out in all places close to the river. On the coast, vegetation was dry or nearly dry on the sandy plains and dunes from West Gwadar Bay to east of Pasni at Kalmat Bay in Pakistan and on the Vashnum Plains and coastal areas near Chabahar in Iran. Green vegetation was present but starting to dry out in the eastern end of the Kulanch Valley which is a well known breeding area near Pasni.

Above average rains fell this year along the coast from Jask to Pasni (Fig. 9). On the coast, rains started in December and ended in late January in Pakistan but continued on the coast of Iran until late March. Rains fell for a total of only four days in Gwadar; three of these were in January and coincided with Turbat, suggesting widespread rains. Since most of the rains stopped so early this year, vegetation on the coastal plains of Pakistan was quite dry apart from the Kulanch Valley which received heavier rains than other places this year. Vegetation on the coastal plains near Jask and Chabahar was greener than Pakistan probably as a result of better rainfall.

Locusts

Scattered mature solitary adults were seen in the Dasht Valley south of Turbat (Fig. 8). About 50 km to south-west, yellow adults mixed with solitary mature adults were present at Shooli where locals reported first seeing a swarm in the late afternoon of 17 April. The swarm was estimated to be of about 200 ha in size and very low in density. As some of the yellow adults showed transient phase characteristics, these locusts are most likely a result of local breeding followed by concentration. There is also a possibility that they may have originated from earlier breeding near Chabahar, Iranshahr or Kharan areas. First to third instar solitary hoppers were first reported at Shooli in late February and fifth instar hoppers were seen in early April. On the coast, one solitary adult locust was seen in the Kalmat area east of Pasni.

In Iran, solitary adults and hoppers were seen throughout the Vashnum Plains near Chabahar. As the vegetation was nearly dry, many of these were concentrating and changing to the transiens phase. At one place, hatching was in progress and high numbers of early instar hoppers were in groups and starting to form small bands within an area of 130 ha. The presence of hoppers of all instars suggests that hatching started in about late March. Hoppers and adults, some in transiens phase, were seen at other places along the coast, particularly near Jask and to a lesser extent south of Zarabad and east of Chabahar.

Control operations were subsequently carried out in Shooli by ULV and on the Vashnum Plains by baiting.

As a result of further adult concentration due to drying conditions, a few more groups or small low density bands are likely on the Vashnum Plains and in the dune area east of Jask. This could inevitably lead to the formation of a few small swarms. Additional rainfall is unlikely during the remained of the spring in southern Baluchistan, so further breeding is not expected. If those infestations that form groups in the above areas are not controlled they will concentrate further and move eastwards from about mid May onwards, posing a threat to the Indo-Pakistan summer breeding areas.

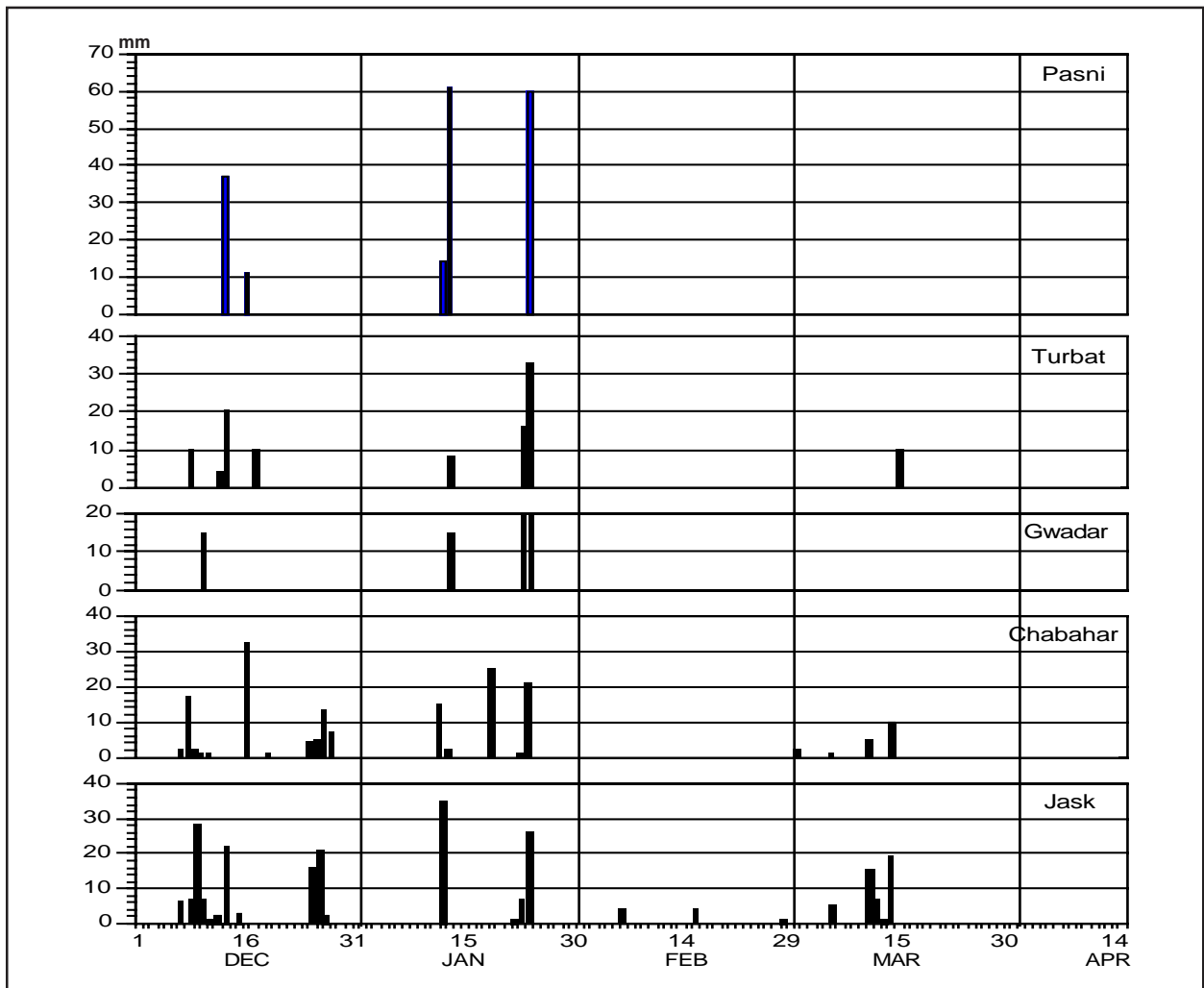


Figure 9. Rainfall in southern Baluchistan, December 1995 to April 1996.

CONCLUSIONS AND RECOMMENDATIONS

(a) Locusts

As a result of good rainfall over a widespread area of Baluchistan during the winter, breeding occurred in several parts of Baluchistan in Pakistan and Iran during the winter of 1995 and spring of 1996 (Fig. 10). Locust adults probably first moved into Baluchistan from the Indo-Pakistan summer breeding areas during the autumn of 1995 and subsequently laid eggs in those places that received rainfall. Although the only report of hoppers was in the Kharan Valley in early December, it is possible that breeding occurred in other areas of northern Baluchistan but was not detected. As a result, adults produced from this breeding may have dispersed throughout Baluchistan, concentrating mainly in the coastal areas from Jask in Iran to Shooli in Pakistan. Although it is a bit unusual, these adults could have moved from the interior to the coast on winds associated with eastward-moving frontal systems during January and February. As temperatures were warmer and rainfall provided good breeding conditions, the adults probably laid in February and March. By late April and early May, vegetation was drying up which forced the resulting hoppers and adults to concentrate and start to change from solitary to gregarious, known as the transiens phase.

It must also be mentioned that there is a low probability that the local populations in Baluchistan were augmented by any adults escaping control operations in the Red Sea area during the winter.

There is a possibility that a few groups and perhaps a swarmlet or two could form in the coming weeks in the coastal areas of Iran as vegetation continues to dry. These will most likely move east towards the summer breeding areas along the Indo-Pakistan border during June and lay eggs with the start of the monsoon rains (Fig. 11). Populations will be supplemented by adults escaping detection and control operations in northern Oman. Consequently, the scale of the movement will be larger than last year and probably consist of moderate numbers of adults. Any control operations undertaken now would reduce the size of this movement. No further breeding is likely to occur in Baluchistan this spring. The situation requires careful monitoring during May and early June in the Shooli and Kharan areas of Pakistan and in the Iranshahr area and on the coastal plains near Jask and Chabahar in Iran.

The team noted that locust survey results and meteorological data collected by agricultural offices in Saravan, Bampur and Chabahar is not always transferred to the PPO Headquarters in Tehran. As this information is important for forecasting and planning, it is strongly recommended that it is sent to Tehran by facsimile on a regular and timely basis.

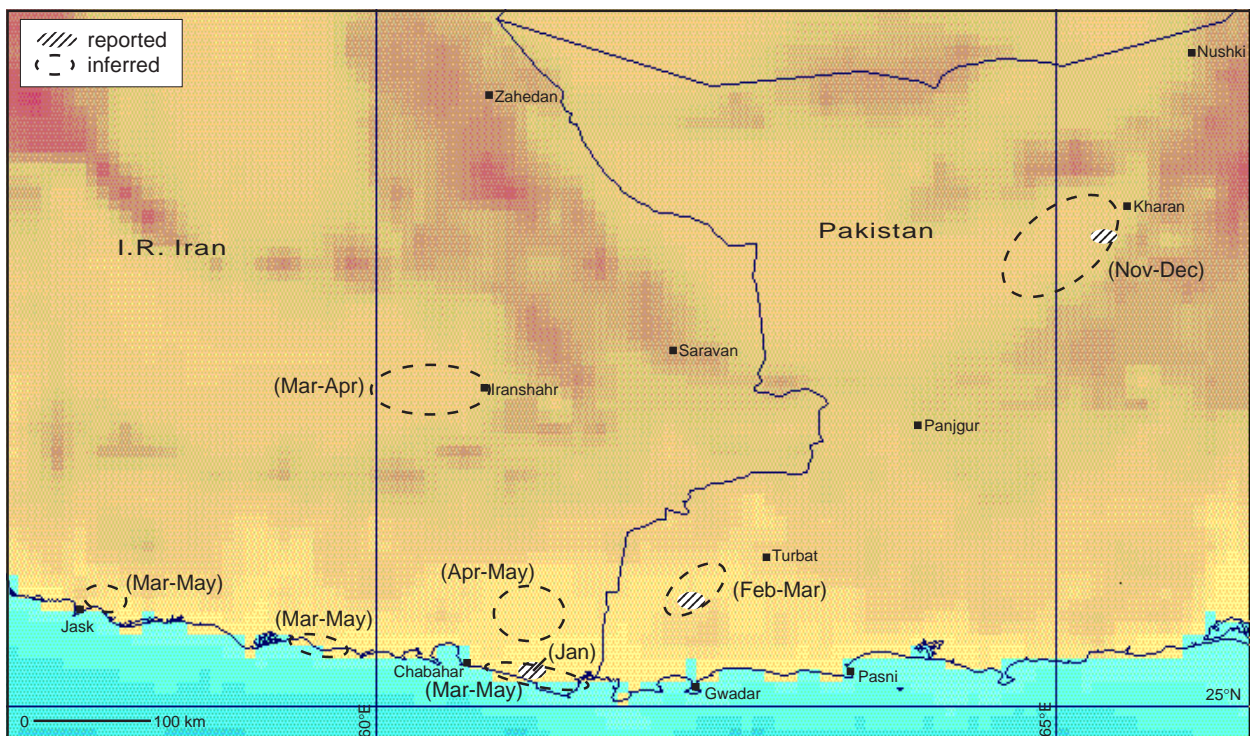


Figure 10. Locust breeding in Baluchistan during winter 1995 and spring 1996.

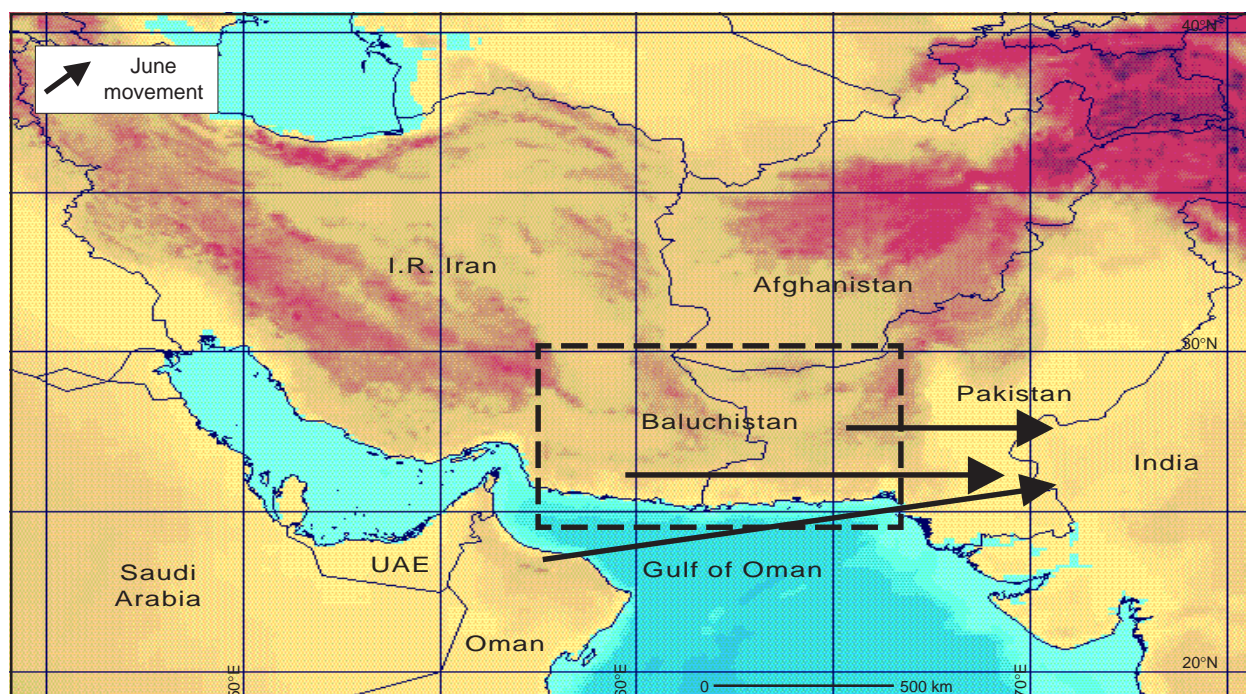


Figure 11. Locust outlook up to early summer 1996.

Steps should be taken to insure that the I.R. Iran has the necessary capacity for survey and limited ULV control in the Chabahar area each spring during the breeding period.

(b) 1997 Joint Survey

The team recommends that a joint survey is undertaken during April 1997. The following points should be considered when organizing this survey:

- (a) Locust Officers, assistants and drivers should be nominated three full months in advance to allow enough time for securing clearances and visas. At least one officer per team must be from Baluchistan and familiar with the locust breeding areas.
- (b) Locust Officers participating in the survey should have previous experience in Desert Locust survey and know how to complete the *FAO Desert Locust Survey Form*.
- (c) One assistant from each country should participate during the entire duration of the joint survey to support the officers and drivers. Each assistant should cross the border with the officers.
- (d) Drivers assigned to the survey should be experienced in driving off-road in the desert and in sand dunes. At least two should be from Baluchistan and familiar with the area. Drivers should not cross the border.
- (e) Countries should provide at least two global positioning systems (GPS), maps of 1:500,000 and 1:1 million scales, and vehicles with drivers.
- (f) All vehicles must be equipped with air-conditioning and be in full operating order prior to the start of the survey.
- (g) The entire DSA should be paid in advance to participants using the same rates as for 1996.
- (h) The Governments of I.R. Iran and Pakistan should investigate the possibility of allowing the officers and assistants to cross at the Mand/Pishin border in order to reduce the large amount of transit time in both countries when only the Mirjaveh/Taftan crossing is used.

(i) One vehicle in Pakistan should be equipped with a wireless radio in Pakistan for communicating to PPD Headquarters and locust district offices during the survey.

Two separate itineraries are proposed for the joint survey in 1997 depending on the possibility of using the Mand/Pishin crossing (Appendix 7). It is highly desirable to use this crossing as it would significantly reduce the transit time and the amount of backtracking over the same route.

Appendix 1. Participants

I.R. Iran

Mehdi GHAEMIAN, Locust Officer, Tehran (Team Leader)
Shirzad BEHZADI KHESHTZADEH, Agricultural Officer, Boushehr
Morad Mohamad JAVAM, Maintenance Assistant, Chabahar
Mohamad KARGAR, Driver
Gol Mohamad ABRAVESH, Driver
Mahmood ATAI, Driver
Ebrahim MIR GOUL, Driver

Pakistan

Mohammad Muzaffar ALAM, Deputy Director, Bahawalpur (Team Leader)
Bashir MOHAMMAD, Assistant Entomologist, Karachi
Mushtaq AHMED, Maintenance Assistant, Karachi
Habib Ur REHMAN, Driver
Abdul RASHID, Driver
Munawar KHAN, Driver
Ashiq HUSSAIN, Driver

FAO

Keith CRESSMAN, Locust Forecasting Officer, Rome

Appendix 2. Itinerary

PAKISTAN			I.R. IRAN		
11-12 April	transit to Mirjaveh/Taftan border	— km	25 April	cross border; Mirjaveh - Zahedan	180 km
13 April	cross; Taftan - Dalbandin	300	26 April	Zahedan - Saravan - Suran	480
14 April	Dalbandin - Nushki	200	27 April	Saravan - Esfandak - Zaboli	390
15 April	Nushki - Kharan	150	28 April	Saravan - Iranshahr - Bampur	330
16 April	Baluchistan Desert west of Kharan	140	29 April	Bampur Plains	250
17 April	Kharan - Panjgur	350	30 April	Bampur - Espakeh - Nikshahr	260
18 April	Panjgur - Turbat	250	1 May	Nikshahr - Chabahar - Veshnam	370
19 April	Turbat - Shooli - Gwadar	230	2 May	Vashnum Plains and coast	190
20 April	Gwadar - Pasni	210	3 May	Chabahar - Zarabad - Jask	390
21 April	east of Pasni	170	4 May	Jask - Zarabad - Chabahar	380
22 April	Pasni - Panjgur	390	5 May	Chabahar - Gwatar - Dashtiari	140
23 April	Panjgur - Kharan - Nushki	470	6 May	Chabahar - Zahedan	690
24 April	Nushki - Taftan	500	8 May	Zahedan - Mirjaveh; Pakistani cross	100
total distance in Pakistan		3360 km	total distance in I.R. Iran		4150
		total			7510 km

