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THE ROLE OF THE MUNICIPALITY OF ALEXANDRIA IN VECTOR-PEST CONTROL

by

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I AREA OF STUDY

Alexandria, the second largest city in Egypt, is located on the Mediterranean Sea about 200 km north-west of Cairo. The city is bounded by the Mediterranean to the north and Abu Qir Bay to the east. To the south lie Lake Maryut and Nouzha Airport as well as several drains and canals. The waterways discharge water ultimately into Lake Maryut. To the west lie Mex-Dekheila, Dekheila airport and the Agamy-Hannoville beaches.

The city extends for about 55 km along the sea-shore from Abu Qir Bay to Agamy-Hannoville and its breadth is approximately 1.5 km to the south-east and south-west.

Several beaches are located along the sea-shore and are regarded as the main recreation areas during the summer season. They are then visited by more than 500 000 seasonal residents in addition to most of the inhabitants of Alexandria itself.

The population of the city is about 2.5 million and population densities vary according to the district; the overall average density is about 2 800 people per sq.km.

II PUBLIC HEALTH IMPORTANCE OF INSECT AND RODENT PESTS

There are many species of insects which are of importance to public health in the Alexandria area. The most important are:

Flies :	M.domestica var vicina, M.domestica var domestica, Musca sorbens, Fania spp. and Stomoxys spp. (where animal sheds are present)
Mosquitoes:	Anopheles pharoensis, Anopheles coustani, Culex univitatus Culex antenatus, Aedes caspius and Aedes detritus
Roaches :	Blatta orientalis, (light infestation), Periplaneta americana and Blatella germanica (heavy infestation)

Fleas: Xenopsylla cheopis, Pulex irritans, Parapulex chephrensis, Leptopsyl segnis, Ctenocephalides canis and Ctenocephalides felis

Lice: Pediculus humanus, capitis and corporis

Rodents represent an escalating economic problem in agriculture. They attack m of the agricultural crops (wheat, rice, maize, citrus and sugar cane) both in the fields and in the collection centres for these crops, causing enormous loss in the yi In addition, they attack the poultry farms established on the outskirts of the city (Ras El Soda and Maamoura farms).

The species present in the area are: Mus musculus, R.norvegicus, R.r.rattus, R.r.frugivorus, Acomys caharinus and Arvicanthus niloticus .

III VECTOR CONTROL ACTIVITIES AND POLICY MAKERS

During the period before 1961, the municipality of Alexandria was a separate and independent organization and was responsible for all services contributing to the city's cleanliness, beauty and freedom from insect and rodent pests; it also issued health certificates for food handlers.

In 1961, Alexandria became a Governorate and the municipality's staff and servic were integrated into the Directorate of Health of Alexandria under the guidance of the Central Government's Ministry of Health in Cairo.

Recommendations concerning insecticides for vector-pest control as well as their formulation are customarily issued by the technical staff of the Medical Entomology Research Institute, Dokki, Cairo and the insecticides themselves are supplied to the Alexandria Directorate by the Ministry of Health.

A technical team representing the Institute visits Alexandria once a year in order to evaluate the effectiveness of control measures and assess the susceptibility levels to the insecticides in use of insects of importance to public health (flies, mosquitoes, lice, fleas and bed bugs) present in the Alexandria area.

Organizations involved in vector-pest control operations in Alexandria are: the Directorate of Health, Alexandria, the Directorate of Agriculture, Alexandria and the Ministry of Supply.

The activities of the Directorate of Health against insects and rodents of importance to public health cover the entire city and harbour of Alexandria. The Directorate of Agriculture is responsible for the control of rodents in the agricultural fields around Alexandria and in the agricultural crop collection area in the outskirts of the city. The Ministry of Supply controls rodents in the warehouses and stores of the cooperatives.

IV TEAMS INVOLVED IN THE REGULAR VECTOR-PEST CONTROL PROGRAMME

A regular vector-pest control programme inside and around the city of Alexandria is carried out throughout the year. Several teams (units) are involved in these regular control operations. All these units are affiliated to the preventive medicine department of the Alexandria Directorate of Health.

The main objective of this programme is to suppress the vector populations inside the city to a tolerable level. This can be achieved through proper control methods, including the use of chemical insecticides or by community participation in source reduction (environmental sanitation). On occasions, environmental management is supplemented by chemical control in an integrated approach.

The teams or units involved in this control programme are the following.

1. The pest control team

This team is responsible for chemical control measures directed against adult houseflies, mosquitoes and roaches inside the city and against lice and fleas among groups such as agricultural workers and inmates of police camps. Such measures includ spraying, fogging or dusting with proper insecticides.

In addition to these insect control operations, the team sets traps at different locations throughout the city, for rat capture and the determination of the rat: ectoparasite (flea) ratio and the presence of any plague symptoms.

2. The malaria control team

This team surveys mosquito breeding places inside and around the city where different types of water bodies are present. It also surveys the resting places for the adults inside buildings, especially on the outskirts of the city.

Control measures against the vector are carried out through·

(a) Larviciding breeding places with 2% malathion E.C. or 2% sumithion E.C once every two weeks;

(b) Indoor-residual spraying with 5% malathion E.C. or W.P.H with a dosage of 2 gr ai/m^2 twice yearly;

(c) Space-spray "fogging" with malathion or neopybuthrin 8/64 in solar or ULV spray with Resilin 25 S.E. (1 litre: 6 1/2 litres kerosene) once a week;

(d) Microscopic examination of stained human blood films, to detect and treat malaria or filariasis cases.

3. The yellow fever control team

Activities cover an area of 2 km in diameter around the entry points to the city (Alexandria Harbour, Nouzha and Dekheila airport). These areas are surveyed once a week to detect breeding places which are treated with 2% malathion. Activities include:

(a) Emptying and refilling water buckets used for control of fire hazards in the cotton export factories located inside Alexandria harbour once per week, to prevent mosquito breeding,

(b) Daily "flitting" inside the entries to buildings in a search for adult mosquitoes (Culex, Anopheles, Aedes). Buildings inside the harbour are sprayed residually twice a year

4. The rodent control team inside the Harbour

This team is affiliated to the Quarantine Department in the Alexandria harbour. It sets traps regularly in warehouses and other buildings inside the harbour. The trapped rats are examined for their ectoparasite (fleas) ratio and are dissected for plague detection. The team also dusts warehouses and other buildings inside the harbour with 5% malathion (20 gms dust/m^2). This operation is repeated every three months.

5. The Environmental Health Department

The Department enforces existing legislation to keep premises free of vectors and rodents.

Relevant legislation is as follows:

Law ## 44 of 1955 : Articles 17 & 18 concerning the validity of the Deratting Certifica carried by ships, authorizes quarantine staff to carry out rodent control operations on the vessel if the certificate is out-dated.

Law ## 78 of 1946 : concerning malaria control practice, authorizes sprayers to enter houses to larvicide by oiling inside toilets and septic tanks once every two weeks.

Law ## 250 of 1956: prohibits rice cultivation around the city of Alexandria within a distance of 5 km to the south and south-east.

These laws are enforced within the city by the Environmental Health Department, Directorate of Health, Ministry of Health.

6. The cleaning team

This team is responsible for the regular sweeping of streets, for garbage collecti and for dumping sanitary waste in an area far to the south of the city.

The types and numbers of vector-control equipment available to each of the vector-pest control units are given in Table II.

7. Health Education Department

The department is responsible for the dissemination of information about the vectors of diseases by means of speeches, posters, films and slides.

V ADDITIONAL VECTOR-PEST CONTROL ACTIVITIES CONDUCTED DURING THE SUMMER

During the summer season, Alexandria inhabitants are exposed to increased numbers of insect vectors such as flies and mosquitoes because the prevailing climatic and environmental conditions favour the propagation of such vectors. Solid and liquid

wastes increase and many garbage heaps are left for several days in the streets before their transfer to the dumping area is completed. Because of the existence of sub-surface water, many marshes form, especially on the outskirts and beach areas. Such factors encourage the breeding of flies and mosquitoes.

In order to supplement the regular continuing services performed by the vector - control units for pest control, yellow fever, malaria, environmental health and cleaning, Alexandria was divided into four zones (East, Middle, West and El Amria) in 1979 for the purpose of augmenting vector control services during the summer. Such activities are carried out from May to October every year. Table III shows the number and types of vector-control equipment used in each of the four zones of Alexandria.

During the summer the regular services of the Malaria Control Unit are supplemented by the addition of five permanent stations in certain sensitive areas in order to assist in mosquito control operations. Such operations include surveys of breeding places, larviciding positive breeding places and fogging for adult control.

VI TYPES OF VECTOR-PEST CONTROL OPERATIONS

Regular vector-pest control operations are performed by means of.

- Chemical control through the use of insecticides and rodenticides;
- Community participation, the elimination of breeding places and the reduction of vector densities, and
- Health education

In Alexandria, chemical control operations represent the principal vector-control measures used for rapid and maximum control of vectors or pests.

The insecticides in use are organophosphorous and pyrethroid compounds. The names, active ingredients, formulations and concentrations of the insecticides used for vector control operations in Alexandria 1981 are contained in Table I.

The desired concentrations are usually prepared from stock daily before application

Rodenticides used are mainly anticoagulants under their individual commercial names, for example, Warfarin, and are formulated locally. In exceptional cases, zinc phosphate is also used. Rodenticides are not applied routinely but only on request.

The following activities will be implemented in the future with the participation of the community:

1 Proper garbage collection and sanitary dumping to reduce fly and rodent density.

2. Construction of sewerage systems in areas such as Ras-el-Soda, Smouha and Agamy which are currently unconnected to the city sewerage system, in order to minimize the number of breeding places for mosquitoes. This activity will be effective in certain districts by 1985.

3. Removal of animal sheds to areas outside the metropolitan area, to minimize breeding places and protect inhabitants against flies, the mosquito culex and rodents.

4. Follow-up enforcement of present health legislation to help keep premises free from insects and rodents.

VII SUGGESTIONS FOR IMPROVING VECTOR CONTROL SERVICES

1. Vector control operations in Alexandria are pursued in accordance with the policy of the Central Government's Ministry of Health in Cairo.

A large number of the personnel engaged in the Alexandria vector-control teams are technically qualified and include: one Ph.D. (entomologist), one Dr P.H. (vector control), one Dr P.H. (epidemiologist), two D.P.H., and 43 B.Sc. (agriculture). Every effort should be made to exploit fully the services of these highly qualified staff members in order to achieve maximum benefits from the vector control programme.

2. A well-equipped laboratory, affiliated to the Alexandria Directorate of Health, is needed for the following purposes:

(a) To study the ecology and biology of insects and rodents in the Alexandria area;

(b) To determine the susceptibility levels of vectors to the insecticides and rodenticides in use;

(c) To study health hazards to the human environment of the insecticides and rodenticides used;

(d) To establish a museum of mounted and preserved specimens of existing insects and rodents of public health importance so as to facilitate identification of samples collected, improve staff training and increase public awareness of the problems,

(e) To monitor and evaluate vector control activities in the city of Alexandria.

All such activities should be pursued in cooperation with the High Institute of Public Health, University of Alexandria.

3. Coordination between the organizations involved in vector-control operations would be enhanced by the establishment of a permanent vector-control board. This board would include: The Under-Secretary of the Directorate of Health of Alexandria, a representative of the Ministry of Agriculture, a representative of the Ministry of Supply, the

Director of the Preventive Medicine Department in Alexandria, the Director of the Health Education Department in Alexandria, the Director of the health units involved in vector-control operations as well as the Professors of Vector Control, Medical Entomology; and Sanitary Engineering, of the University of Alexandria

Representatives of the Armed Forces in the Northern District and of the food industries in Alexandria should also be included

The role of the Board would be to supervise all vector-control activities in Alexandria including the chemical, environmental, financial and administrative aspects, and to coordinate the activities of all interested organizations

4. Training courses should be organized for all categories of vector-control personnel in Alexandria with a view to updating their knowledge, particularly in the field of integrated vector-control.

TABLE I

INSECTICIDES USED FOR VECTOR-CONTROL OPERATIONS IN ALEXANDRIA

IN 1981

NAME	% Active ingredient	Type of formulation	Working concentrations	Quality/year
Malathion	57	E.C	2% in solar (larvic) 3% in solar fog (adult)	4274 lit
Malathion	5	Dust	5% dusting	3400 Kg
Malathion	1	Dust	1% dusting	350 Kg
Sumithion	40 Fenitrothion	W.P.	5% residual spraying (adult)	900 Kg
Neopybothrin 8/64	S Bioallethrin 8% P.B. 64%	Oil	1% fog (adult)	90 lit
Neopybothrin S 200 k	S Bioallethrin 0.8%	Oil	1% fog (adult)	200 lit
	Permethrin 2.8% P.B. 4.0%	Oil		
Resilin 25Sk	S,Bioallethrin 1.15%	Oil	1: 6.5 kerosene	
	Permethrin 7.35% P.B. 8.5%	Oil	ULV"adulticide"	75 lit

TABLE II

TOTAL NUMBER AND TYPES OF EQUIPMENT USED FOR VECTOR-CONTROL OPERATIONS IN ALEXANDRIA

TYPES OF EQUIPMENT	NUMBER OF EACH TYPE OF EQUIPMENT				
	Pest Control Unit	Malaria Control Unit	Y.F. Control Unit	Quarantine Team	Total
I Hand operated compressed sprayers	30 cap. 10 lit.	121 Hudson 10 Japanese 131 Total	25 "Hudson"	2	188
II Mist blowers:		-	-		
Hand carried	3	-	-	1	4
Vehicle mounted	-	One Tifa	-	-	1
III ULV pesticide applicators.					
Hand carried	-	5 Mierosol	-	-	5
Back carried	-	2 Solo	-	3 Solo	5
Vehicle mounted	3 Leco H D 1 Japanese	1 Mini Leco H.D 1 Leco H.D.	-	-	
	4	2			6
IV Thermal foggers					
Hand carried	4 Swing fog	7 Swing fog	--	-	11
Vehicle mounted	4 Tifa	2 Leco H D			6
Dusters·					
Hand Dusters					
Plunger type	100	-	-	10	110
Rotary type	7	-	-	-	7
Power type	3	-	-	-	3
Other types					
Power Sprayer					
Beam Cap.100 lit	-	1	1	-	2
Beam Cap.600 lit	5	3	-	-	8
Hand operated sprayer					
Flitting	-	-	40	-	40

TABLE III

NUMBER AND TYPES OF VECTOR-CONTROL EQUIPMENT USED:

IN EACH OF THE FOUR ZONES OF ALEXANDRIA

ZONE	THERMAL FOGGERS MOUNTED	ULV MOUNTED	SPRAYERS	KNAP SPRAYERS
East	2 Tifa 100 A	4 Leco H.D.	-	-
Middle	2 Tifa 100 A	-	1 Beam (100 lit)	- -
West	-	-	-	-
El Amria	3 Tifa 100 A	-	-	5
TOTAL	7 Tifa 100 A	4 Leco H.D.	1 Beam	5 Knap sprayers

ANNEX I

MAP OF THE ALEXANDRIA AREA AND THE BASINS OF LAKE MARYUT