ECOLOGICAL STUDIES ON HONEYBEE ACTIVITY IN GOVERNORATE NORTH SINAI

By
EMAN ZAREF NASER AHMAD
B.Sc. Agric. (Plant Protection), 1991
Fac. Agric., Moshtohor
Zagazig University

THESIS
Submitted in partial fulfillment of the
requirements for the degree of
Master of Science
in

ENTOMOLOGY (APICULTURE)

Plant Production and Protection Department
Faculty of Environmental Agriculture Science
El-Arish
Suez Canal University

2000

ECOLOGICAL STUDIES ON HONEYBEE ACTIVITY IN NORTH SINAI

BY

EMAN ZAREF NASER AHMAD
B.Sc. Agric. (Plant Protection), 1991
Fac. Agric., Moshtohor
Zagazig University

Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of

M.Sc.
in
ENTOMOLOGY (APICULTURE)
Supervision

Dr.G.A. Magdy vice president of Education and students Affaires Prof. Of Food Technilogy agric. Sci. Fac. El Arish Suez Canal Univ.

Dr. M.M. Khattab
Prof. Assistant Economic Entomology Fac. Agric.
At Moshtohor
Zagazig Univ.

Dr. M.N. El-Bassiony
Prof. Assistant Economic Entomology Fac.Agric.
El- Arish
Suiz Canal Univ.

Department of plant Production and Protection Faculty of Environmental Agricultural Sciences
Suez Canal University
2000

CONTENTS

Page

INTRODUCTION 1

REVIEW OF LITERATURE 3

MATERIALS AND METHODS 30

RESULTS AND DISCUSSION 36

1- Ecological conditions at El-Arish region 36

2- Activity of honeybee in brood rearing 68

3- Honeybee activity for storage pollen grains 71

4- Honeybee activity of wax secretion 74

5- Honeybee activity of propolis collection 74

SUMMARY 80

REFERENCES 82

ARABIC SUMMARY .....

ECOLOGICAL STUDIES ON HONEYBEE ACTIVITY IN NORTH SINAI

BY

EMAN ZAREF NASER AHMAD
B.Sc. Agric. (Plant Protection), 1991
Fac. Agric., Moshtohor
Zagazig University

This thesis
For the degree of

MASTER
in

ENTOMOLOGY (APICULTURE)

HAS BEEN APPROVED BY:

Committe in charge

DATE: / / 2000

A CKNOWLEDGMENT

Firstly my unlimited to "Allah"

I Would like to thanks and to express my sincerely gratitude to Dr. M.M. Khattab Prof. Assistant Economic Entomology Fac. Agric. At Moshtohor,

I would like to thanks Dr. M.N. El- Bassiony Prof. Assistant Economic Entomology Fac. Agric.Sci. El-Arish Suez Canal Univ.

And thanks . Dr.G.A. Magdy Vice President of Education and students Affaires Prof. Of Food Technology Agric. Sci. Fac. El-Arish Suez Canal Univ. for his help and guidance throughout the work for their supervision suggesting, the problem, valuable help to plane this study interest encouragement and guidance through out the work and preparation of thesis.

I would like also to express special gratitude to all staff members of the department of plant production and protection Faculty of Environmental Agricultural Sciences Suez Canal University.

Iam very much obligate to my haspint , all my friends and family for their help and enco uragement.

INTRODUCTION

Climatic area

General climatic in this area preferred of winter fluctuation somewhat and straight, for at locality next to the sea white, and no high much on service of the sea, while the summer is stable rain less and sky serenity in except some clouds low in the morning. While in seasons spring and autumn weather is fluctuation of the rate less than winter, and preferred also glowing wind Khamsin and fall some rains tremor and abundant sometimes.

The temperature is minimum rates in the winter where arrive to the mean of maximum about 20°C in the noon period and arrive to the mean of minimum about 7°C in the morning. While the temperature is in the spring fluctuation then arrive at the mean of maximum about 26°C and get to the mean of minimum about 13°C, while in the summer season the temperature is straight, and get to the mean of maximum about 33°C, while the mean of minimum is about 15°C.

The wind in the winter season is fluctuation but preferred blowing south wind straight and weight of, while in the spring season different where blowing from north east and north but blowing also from south west in the morning probably while in the summer season the wind blowing from north and north occident and active in the noon period for at coast with zephyr sea. While in the autumn season the wind blowing from north west and blowing strong from south accompanied stirring sand and heat waves length in the autumn season than in the spring season.

The rains quantity of the rain little to attain about 100mm per Year descend the rain in the winter for shape to attain maximum quantity during December and January and to attain quantity the rain in the one day about 30mm. While in the spring quantity the rain is little likeness apparently than in the winter and it is abundant and thunder some times, in the summer scarce the rain approximately. While in the autumn the rain descent in the let months October and November to happen shower strong from the rain and also to happen flood in the area slope the water.

Relative humidity to attain to indicate humidity on the coast about 70%, while little gradually whenever in the said to reach about 40%, while decreased humidity in the desert gradually

increased the temperature. Humidity effect in the studied area, anyhow increased to make earth tolerance of the high temperature was to keep soil proportion from the water. Whereas, non-production soils may be due to decreasing the humidity levels which affected by dryness and low temperature.

This investigation carried out to study the effect of the environmental condition of North Sinai governorate on honeybee activity.

Good understanding of the behaviour of the honeybee (*Apis mellifera* L.) under various different ecological conditions, enabled beekeepers to gain much success in their management. It is known, that the weather conditions are the most important factors that affect the honeybee activities exerted throughout the year. There for many years ago beekeepers have been interested in the relationship between honey production and weather conditions. Attempts have been made to detect the relationship between temperature, light, weather conditions such as wind velocity, air humidity (R.H.) and other aspects of honey bee behaviour and each factor of low temperature affects directly the rate of consumption of the stored foods and mortality of the worker bees. A high wind velocity prevents flying activity and may kill great numbers of flying bees.

The honeybees production depends on (bees and other products) different considerable factors. Some of them influence the activity of the bees themselves directly and the others acting indirectly on the nectar and pollen production of the plants and the air temperature has a great effect on the flight activity of bees (**Demuth, 1919, Hambelton, 1925, Moffet, 1953, Milum, 1961 and Koch, 1967).**

In Egypt, little work has been done to study the honey flows and the effect of temperature on honeybee activities such like the worker of at Giza region. **El-Nahal, 1947 and Wafa & Ibrahim, 1959**. Therefore it is left necessary to study the behaviour of honeybee colonies under different environmental conditions of Egypt.

This present study has the due to investigate involved the effect of El-Arish region environmental conditions on honeybees and their production.

REVIEW OF LITERATURE

1- Body Temperature of Honeybees

Bees are polykilo therman animals. Their body temperature is the same or very nearly the same as that of their surroundings. This does not mean that a single bee can live when the temperature by freezing point.

Pirch (1923) showed that the quite bee has a body temperature the same as that of the air surrounding it excepts in unusually high or low temperatures.

Snodgrass (1925) stated that the bees have no direct means of controlling the radiation of heat from their bodies. He added that bees, which fly in the air, have got temperature about the same, as that of the surrounding air, but honeybees in their colonial life possesses the power of regulating the temperature of their hives to a certain extent.

Dunham (1929) found that the body temperature of the honeybee was higher than the air temperature, but the difference tended to decrease at high air temperatures.

Phillips (1946) proved that when the surrounding temperature was higher than the preferred temperature, the bees were able to hold their inner warmth 11to12 degrees below the surrounding heat, since during respiration the inner tissues could be energetically cooled by evaporation.

Esch (1960) found that the thoracic temperature of dancing bees out- side the hive was 10°C higher than the surrounding temperature, and also when the bees were inside the hive. When the thoracic temperature reached 36°C, regulatory mechanism comes into action which keeps it constant when the external. Temperature rises furthermore.

Smith (1965) stated that the temperature of the body of a bee is approximately that of the surrounding air, but activity will cause its temperature to rise. In cold climates when the air temperature falls below 18°C (64°F) the bees begin to form a cluster. The cluster is definitely formed at 13°C (55°F). The bees on the outside of the cluster remain still with their heads directed towards the center. In the center of the cluster the bees generate heat by their own metabolism. The loss of heat from such a cluster by conduction is negligible, the main losses are by radiation and convection. When the air temperature falls, the size of the cluster contracts, reducing it's radiating surface. When the temperature rises the cluster expands, increasing the radiation. The temperature outside the cluster should not fall below 10 - 12°C (50 – 55° F), though on the underside it may be as low as 9°C (48°F). Bees chill at 8°C (46°F) and fall from the cluster. At the center of the cluster the temperature varies between 20°C (68°F) and 30°C (86°F) and never become less than 17°C (63°F). But once the brood rearing has begun the temperature is maintained at between 31°C and 35°C (88-95°F). The heat of the brood nest is generated by activity and metabolism.

Okada *et al.*, (1984) examined the two *Apis cerana* colonies and one *A. mellifera* colony that died during the winter in the Tokyo area, Japan. They found that, the mellifera queen contained almost twice as many ovarioles as the cerana queens. In one cerana colony, nearly 23% of the workers were yellowish and the rest were black. The mean numbers of cells per 100cm2 of comb were 465 and 504 in the cerana colonies, 416 in the mellifera colony the figure was >25%. Many mites of the species *Tyrophagus putrescentiae* were found in crumbs of was on the bottom of the cerana hives. Larvae of *Galleria mellonella* were present in all 3 colonies.

Dulta *et al.*, (1988) stated that twenty *Apis cerana* colonies (10 strong and 10 weak) were studied from June to October in temperate conditions in India. In colonies that absconded [number not stated] there were marked decreases in areas of honey and pollen stores and of sealed and total brood: the number of larvae dropped to zero. In colonies that did not abscond, honey stores increased and decreases in pollen stores and in brood rearing were much less than in absconding colonies. It is concluded that, in this study, colonies absconded when the areas of honey and pollen stores were less than 710 and 20 cm2, respectively, and the areas of eggs, larvae sealed and total broods were less than 50, 1, 10 and 60 cm^2, respectively.

Levin and Collison, (1990) state that summer broodnest temperatures recorded with thermocouples in honeybee (*Apis mellifera* L.) colonies varied in relation to developmental brood stage and position within the broodnest. Areas containing empty

drove cells were significantly warier than those containing empty worker cells, while -worker larvae and pupae had significantly higher temperatures than those of Jrones. Worker brood was maintained at a significantly higher temperature than drone brood in the central broodnest (frames 4-6) while not significantly different in the outer broodnest regions. Drone brood temperatures were significantly lower than those of workers in the uppers lower and peripheral comb octads, while not significantly different in the central octads. In colonies used for temperature readings, the distribution of worker and drone brood was related to broodnest temperature when broodnest position was not considered. A similar relationshiphowever was not found for most frame and comb octad positions.

Wael *et al.*, (1990) stated that the effect of temperature (4 – 35°C) on longevity of *Erwinia amylovora* was studied in artificially infected samples of nectar, honey and different parts of the honeybee colony (wax, debris propolis and pollen). The longevity of the bacterium decreased with increasing temp. At 4°C it remained viable for 11 weeks in nectar and 8 weeks in honey, survival time in these media decreasing to 1 day at 35°C, the temperature of the brood nest. Debris, wax and propolis were poor conservation media for *E. amylovora*. The maximum longevity in wax was 3 weeks at 4°C. Regardless of temperature the bacteria survived no longer than 1 day in debris and propolis, In pollen, survival time was at least 50 weeks at 4°C but < 1 week at 35°C. Given the continuous fluctuations of temperature in a honeybee

colony, results suggest that the substances tested are unlikely to act as sources of fire blight infection. This paper was presented at the 42nd international. Symposium on crop protection held at Gent, Belgium, 8 may 1990.

2- Measuring the activity of honeybees.

There are different methods for measuring the honeybee activities.

A. Brood rearing activity.

Nolan (1925) made very accurate measurements of sealed brood during summer by shaking all the bees off every brood comb, photographing each side of the comb along with a grid of 1- in^2 super imposed and then estimating the numbers of sealed brood cells either by counting in square inches or by counting individual cells.

Tadros (1961) used the planimeter in estimating the brood areas produced by colonies.

Herbert (1979) found that whey and yeast products were fed to small cage colonies of newly emerged honeybees to determine their effectiveness as pollen substitutes. Bees were able to rear brood to the sealed stage when fed all diets with the exception of whey alone. Brood rearing was greatest on pollen. Wheast or 2:1 yeast-whey formulations. All yeast-whey formulations, however, were inferior to pollen and wheast.

Woyke (1981) stated that observations were made over a 42-day period in El Salvador in 4 apiaries during the main honey flow,

from early December 1980 to January 1981. Calculations were made of the number of brood cells, the total population of bees, mean lifespan, and honey production. The average number of brood cells produced in a colony over the 42 days was 43 200, but only 22 100 bees survived for the shole 42-day period (51.2%). The average lifespan was 22.1 days and it was calculated that the average period of productive life was 17.3-33.6 days. Honey production was closely correlated with the intensity of foraging activity.

Nelson (1982) found that brood rearing and honey production were monitored in (A) 7 colonies which became queenless, (B) 5 whose queen failed and/or was superseded, (C) 4 which swarmed. In A, average brood area was 77.4% that of normal colonies and honey production was 61.9% of normal; for B the percentages were 81.6 and 64.5% of normal, respectively. In C, average brood area up to the first day of swarming was 16% more than that of colonies which did not swarm, but honey production of C colonies was only 45.8% of normal.

Rogers *et al.*, (1982) found that in this study, which started in 1976, the effects of electric fields on wildlife, honeybees, cattle, crops and other vegetation, are being examined. In 1981, 6 groups of 5 honeybee colonies, each in 3 deep hive bodies, were exposed to field strengths between 0 and 12 kv/m exposed colonies gained less weight than controls, but brood production was unaffected by the electric field. Adult mortality was highest in colonies exposed to the strongest fields. Results are also given for induced hive currents, hive temperatures and propolis deposition.

Brunsvold and Villumstad (1983) stated that Spring brood production of 40 relatively weak colonies was measured in 1981 and 1982, using hives with a sheet of bee-proof netting as a floorboard instead of a solid one. Some hives were provided with extra insulation under the netting floorboard. Brood production was photographed and hive temperatures were recorded. There was some indication that the insulated hives had more brood in may than the others, but the difference was not statistically significant.

Eischen *et al.*, (1983) found that small colonies of *Apis mellifera*, each consisting of a caged queen to which bees had access and young workers ranging in number from 200 to 2800,were given 400 eggs to rear workers in small colonies ate more pollen and reared more brood per individual than did workers in large colonies. A positive correlation was found between pollen consumption by workers and number of progeny reared per worker. Progeny exhibited varying lifespans that were negatively correlated with pollen consumption and rearing efficiency of workers. Dry weight of brood progeny was also negatively correlated with these brooked rearing parameters. The results suggest that as workers rear increasing numbers of progeny, there is an associated decrease in progeny lifespan and dry weight.

Nelson and Gary (1983) stated that the relationship between queen weight, queen attractiveness, sealed brood area, and colony honey production were investigated using queens produced in California, USA. Queens attractiveness to workers varied greatly, but was not correlated with any of the other measured parameters.

Queen weight, 18 hours after removal from mating nuclei, averaged 214.4 mg and decreased to 207.9 mg after 8 days of storage and transit. The queens were transported in package colonies to Alberta, Canada, and subsequent data were obtained for 47 of the original 56 queens. At the peak of the honey flow average queen weight had increased to 292.9 mg. Honey production, which averaged 63 kg/colony, varied greatly (24-90kg/colony) but was correlated positively both with sealed brood area and with queen weight after removal from the mating nuclei. A practical method of eliminating some of the less productive queens would be to remove them from the mating nuclei, when about 12 days old, and discard the lightest 15-25%.

Woyke (1984) found that an investigation of factors influencing honey production was conducted using 12 colonies of *Apis mellifera*. With 3 replications in time. Brood areas, colony populations and weights of honey produced were measured. On average, adult worker populations amounted to only 40-60 % of the numbers that should have emerged, based on brood cell estimates for the preceding 42- day period. Correlation coefficients between numbers of brood and resulting numbers of adult bees varied from ±0.20 to ±0.86, and values of r for population and length of worker life from –0.39 to ± 0.92. Average length of productive life of workers varied from 21 to 25 days and average number of larvae reared per worker bee from 0.8 to 1.5 workers rearing more brood were shorter lived (r= -0.71 to – 0.94). Individual colonies produced between 4 and 26-kg honey. Production was related in varying

degree to number of brood reared (r = +0.20 to +0.85) and to colony population (r= +0.38 to + 0.70). Individual productivity of workers had a greater influence than colony population on the amount of honey produced, as evidenced by the high coefficients of non – determination for regression of weight of honey on population and the large standard deviations of the regression coefficients, as well as the highly significant values of Chi^2 for inter-colony comparisons of honey production per 1000 bees. Because of their higher brood production, colonies headed by queens 1 year old produced 19-27% more honey than those with queens 2 years old. It is concluded that honey production is governed by the interaction of 3 primary factors: average daily brood production, length of worker life and individual productivity of workers the relative contributions of these factors vary.

Seeley and Visscher (1985) found that seasonal patterns of food storage brood rearing and swarming were studied in *Apis mellifera* colonies in New York State and Connecticut, USA. The period of food collection was 14 weeks; a colony consumed 20kg or more of stored honey during the winter. Brood rearing started on a small scale in mid-winter and increased rapidly in April. Most swarms issued in late spring and early summer, and were thus able to collect sufficient stores before winter. In colonies where the onset of brood rearing was experimentally delayed until early spring, colony development was retarded, and swarming occurred late in the sea- son. These late swarms were less likely to survive the winter than swarms, which had issued earlier. It is concluded that

the timing of colony growth and reproduction are adaptations for winter survival of honeybees in cold temperate regions.

Harbo (1986) studying the effect of population size on brood production, worker survival and gain or loss of honey was studied in colonies of honeybees in Louisiana, USA. About 11kg of bees were caged, stored for two days and subdivided into five populations numbering 2300, 4500, 9000, 17000 and 35000 bees. Each colony was started with a lying queen no brood, and 230 bees per 1000 cm^3 of hive space. The test ended 19 days after queen release, just before adult bees began to emerge. The test was conducted 10 times (two replicates being used in each of February, April, June, and October). The two largest populations produced more honey per bee and in dearth times and winter consumed less honey per bee. Colonies of 4500 bees produced the most brood per bee; as population increased above that number brood production per bee decreased. However, during summer dearth, the colonies of 9000 bees produced the most brood per bee. Overall, the optimal colony size was 9000 bees; the rate of weight gain in colonies of this size was nearer to that of the two largest populations and the rate of brood production was nearer to that of the two smaller colonies.

Hellmich *et al.*, (1986) showed that honeybees (*Apis mellifera*) from a line which had been selected for high pollen-hoarding behaviour (HPH) boarded more pollen than bees from a low pollen-hoarding line (LPH) when they were kept in observation colonies with known amounts of brood. These differences were not

found when brood was in the egg stage and pollen stores were small but were large and significant when brood was in the larval stage and pollen stores were more abundant. Differences in amounts of stored pollen that were established between the lines during the larval stage were maintained after brood cells were capped, but amounts of pollen stored did not change significantly. HPH bees also hoarded more pollen in the absence of brood. The two lines used similar amounts of pollen and reared similar amounts of brood. Mortality of the LPH bees was higher and varied significantly more than that of the HPH bees. It is suggested that bees, which hoard a large amount of pollen, are either less inhibited from collecting pollen by the presence of stored pollen or more stimulated to collect pollen by its absence.

Milne *et al.*, (1986) found that measurements were made of Corbicular areas (of a total of 1025 Corbiculae) in 2 lines of honeybees (*Apis mellifera*) selected for high and low pollen hoarding respectively. The sample from each line comprised about 30 newly emerging workers from each of 9 queens representing 3 sublines. Analyses of variance revealed highly significant differences among the 18 queens ($p<0.0001$) and between the lines ($p < 0.0001$). Mean Corbicular area for the high pollen-hoarding line (1.909 ± 0.004 mm^2) was greater than for the low hoarding line (1.874 ± 0.003mm^2) of the 9 queens whose worker progeny had the largest Corbiculae. 7 belonged to the high pollen hoarding line. A Mann-Whitney U-test of rank indicated that the distribution of the queens for the 2 lines differed significantly ($p<0.05$). Assuming the

difference to be genetic, as indicated from a previous heritability estimate, unintentional selection for worker Corbicular area must have been performed during selection for divergent pollen-hoarding ability in the colony.

Young *et al.*, (1988) found that double- super hives with different numbers of full frames of honey were insulated with fibreglass and black polythene and covered with a plywood sheet. They were overwintered in a site protected from wind on all but the north side, where the average daily temperature from November to March was – 6°C brood rearing in the spring in colonies with autumn stores of 20 kg or more of honey was satisfactory. Those with 10 kg or less did not survive the winter. Colonies with the biggest reserves of honey were able to feed and regain lost weight more quickly in the spring.

Szabo and Lefkovitch (1989) found that the honey production of 23 honeybee colonies was recorded for 2 consecutive year. Brood areas and colony populations were measured during the honey flow. Queens who were 1, 2 or 3 years old were used. Mean honey production was 120.2kg/colony, varying from 60.9 to 210.8 kg. The number of worker brood cells on average was 26 200 on 17-18 June, and 36 200 at a second measurement 21 days later. The average worker population 42 days after the first brood measurement was 44 900. The only significant difference in the colonies which depended on the age of the queens was in the number of drone cells (drone population 1700 and 800 with 2- and 1- year-old queens, respectively). Honey production was

significantly correlated with the number of worker brood cells of the first measurement, with worker population, with the number of drone brood cells, and with the drone population, but not with the second measurement of the worker brood cells.

Webster and Peng (1989) showed that within 7 days, small honeybee (*Apis mellifera*) colonies that consumed low levels of methamidophos in sugar syrup lost more eggs and larvae than control colonies, without conspicuous loss of adult workers. The youngest brood and brood at the transition between developmental stages were most sensitive. Development of surviving brood was not slowed appreciably by colony consumption of methamidophos. Environmental variables such as weather and nectar availability affected the sensitivity of the brood to the pesticide colonies observed over a 13-weeks period recovered rapidly and completely from a single 2.0-mg/litre treatment, without residual effects on uncapped brood, capped brood, honey storage, or queen survival. Larvae were more sensitive than queens, and adult workers were least sensitive. Brood and queens were less sensitive in small colonies than in large colonies. Implications for the mechanisms of pesticide damage to brood rearing and for remedial actions by beekeepers are discussed. The techniques described are effective for short-term and long-term studies of pesticide consumption on brood rearing and queen survival.

Szabo and Lefkovitch (1991) stated that population growth was recorded at intervals of 21-34 days in 29 overwintered Apis mellifera colonies in Alberta, Canada: the queens were 1 or 2 years

old. The study lasted until the middle of the nectar flow (mid-July). On 2 April the mean worker brood area (cm2) was 1060, increasing to 3760 (6 May), 6610 (2 June) and 8380 (23 June); the average number of combs covered by bees was 3.98, 6.52 and 13.4, respectively, on the first 3 dates [not recorded on 23 June]. Mean number of workers increased to 39 669 by 17 July and the number of drones to 1779 on 6 May, colonies with 2-year-old queens had more combs occupied by workers and larger areas of drone brood, but later in the season the queen's age did not affect brood area, population or honey production. The latter (measured at the end of the season) varied from 38.7 to 139.9 kg (mean 88.4 kg).

Villa *et al.*, (1991) proved that the survival of Africanized honeybees, *Apis mellifera*, in temperate regions was evaluated in Germany during the 1988-89 winter. Africanized, local European, and Africanized X European colonies were started by queen introductions on 5 August, and all surviving colonies were depopulated on 21 February. 5 of 9 Africanized colonies had died by the end of the experiment, whereas all 8 European and all 5 Africanized X European colonies survived. Brood production of the 3 genotypes declined from 18 August until 13 November, with significant differences on 2 of the 7 measurement dates. Brood areas were not different among surviving colonies that had resumed brood production by 21 February. Changes in total colony weights through time were not different. Significant differences were found in the rates of colony weight loss [total weight lost /(average weight of adult bee X time)] and in final adult population size. The higher

attrition of worker populations and the higher mortality of Africanized colonies suggest a possible reduction of their adverse effect as their range expands northward to temperate areas in the USA. The intermediate values for all characters in the Africanized-X European colonies suggest that genes underlying overwintering characters are additive. This additive will permit different levels of hybridization for different ecological zones, thus complicating predictions about absolute climatic limits.

B. Pollen gathering activity.

There are different methods for obtaining date on pollen collected by honeybees and brought in the hive.

Betts (1926), in England, identified the pollen gathered by foraging workers entering the hive. She did not give any data about the relative amounts of the different pollens collected.

Todd and Bishop (1940) used the pollen traps and recorded the total weights of pollen grains gathered by colonies throughout the year in four localities in California.

Synge (1947), in England, found that the used trap removed approximately 25% of the total weight of the pollen loads gathered and brought to the hive. She pointed out that no method of automatic trapping devised could be expected to yield exact results, since the number of pollen loads removed from the workers depend to a considerable extent upon the size of the loads which vary considerably.

Rashad (1957), in USA, used an electrical machine for periodical pollen collection from the hive.

Khattab (1976) illustrated that ten pollen traps with an efficiency of 20% for trapping pollens were placed at the hive entrances of the experimental Carmiolan colonies. Five of these traps placed on hybrid while the others placed on El-Wadi El-Gadid hybrid colonies. He found that El-Wadi El-Gadid colonies were more active in gathering pollen than the Carniolan colonies during a year of the experiment, they trapped 10.269 kg and 8.624 kg, respectively. July represented the highest amount of pollen gathered, which resembling 28.34% of the total amount pollen gathered during the whole year. January recorded the lowest amount of pollen gathering, it resembling about 1.3%.

Rizk and Attallah (1978) showed that four equal-strength colonies of Carniolan bees were fitted with pollen traps in order to monitor pollen-gathering activity of honeybees in Minia, Egypt, during one year (1976-1977). The main sources of pollen were *Vicia faba* (49.73%), Zea mays (19.37%) and *Trifolium alexandrinum* (17.66%). Cotton tended to be nectar, rather than pollen, source. The main pollen flows were in December - February (*V. faba*), May - June (*T. alexandrinum*) and July-September (*Z. mays*). Mean daily temperature had a significant effect on pollen foraging; an increase of 1°C increased the mean weight of pollen trapped per collection by 16g. The effect of mean daily maximum temperature was also positive, but not so pronounced. A decrease in daily mean RH of 1% reduced the mean weight of pollen by 2.6 g

per collection. The combined effects of weather factors accounted for 60.5% of the variability of *V. faba* pollen collected, 48.89% of *T. alexandrinum* pollen, and 81.17% of *Zea mays* pollen.

Adams *et al.*, (1979) remarked that pollen analysis of nectar shaken from combs, and changes in hive weight, were used to identify floral honey sources. This method identified the sources more completely than examination of honey at the end of the season.

Mohamed and El-Shaka (1979) showed the two peaks in pollen collection were observed during the year of study (April 1974 to March 1975). The first was during May and the second was during August. The trapped pollen during these two months was 291.05 and 156.73 g/colony, respectively. The smallest amount of pollen collected was during January it was 13.25 g/colony.

Olsen *et al.*, (1979) found that pollen trapped from colonies located in areas of apples, blueberries, cucumbers and strawberries was identified to plant species. Apple and strawberry pollens were well represented in the samples. Colonies in blueberry areas collected some of its pollen, whereas no cucumber pollen was detected in the traps.

Rashad *et al.*, (1979) mentioned that four major pollen sources were observed in Giza region. The total amounts of pollen trapped from four honeybee colonies located in the apiary of faculty of Agriculture Cairo Univ., averaged 401.4, 257.9, 113.3 and 29.0 g/colony related to Egyptian clover, maize, wild mustard and broad

bean respectively. The average weight of pollen load collected from these crops was 17.8, 17.2, 14.2 and 11.4 mg, respectively.

Adams and Smith (1981) found that in 1979 a comparison was made between pollens identified in samples of fresh nectar taken from 3 hives, and in the honey harvested from the same hives. Certain differences indicate the need for winder studies of the pollen analysis of such nectar, in relation to the assessment of the floral origin of honey from its pollen analysis. The data also indicate some pronounced differences in foraging patterns between the colonies.

Dietz *et al.*, (1981) stated that in 1980-1981 at 3 sites in Georgia, USA, several colonies of equal strength were selected for pollen production, and their hives were fitted with OAC pollen traps. At all sites brood rearing was significantly lower in colonies fitted with traps than in colonies without traps (by an average of 26% less brood area). Colonies used for pollen production did not swarm as readily as controls. Winter losses of colonies with traps were higher than for colonies without traps, but the difference was not statistically significant.

Hussein (1981) showed that pollen was collected in pollen traps fitted to 4 hives at Assiut, Egypt from January 1980 to June 1980.In 1980, the mean weight of pollen collected was 2281 g/colony. Pollen collect-ion was highest in March and September (mean 353 and 418 g/colony/ month, respectively); lowest collections were in November and December. A highly significant positive correlation was found between amount of pollen collected

and brood rearing. Colonies with pollen traps produced less honey and reared less brood than control colonies.

Boch (1982) mentioned that although the pigments of pollen responsible for its yellow colour, and also for the absorption of long-wave UV light, attracted foraging honeybees to pollen sources in the flight room, they appeared not to be directly associated with the substance(s) that attracted bees in the hive to eat the pollen fed to them.

Schmidt (1985) showed that several pure species (*Cereus giganteus, Simmondssa chinensis, Prunus dulcis, Lurrea tridentata, Populus fremonia*) of pollen collected by honeybees (*Apis mellifera*) plus mixtures of bee-collected pollen were analyzed for the presence of phagostimulants by feeding of extracts of them mixed with candy to caged bees and measuring the amounts consumed in comparison with a reference food. All species and mixes of pollen even the poorly nutritive and unpreferred cotton wood pollen (*P. fremonia*) contained phagostimulants. Phagostimulants were found in extracts prepared with polar solvents, non-polar solvents, and solvents of intermediate polarity. Phagostimulants were found in all fractions collected from salicylic acid column chromatography except the least polar fraction consisting mainly of hydrocarbons and other extremely non-polar compounds. Thus the results suggest that phagostimulants in pollen are not limited to one discrete class of compounds, and likely comprise a variety of compounds. Pollen consumption by bees is probably induced primarily by the cumulative effects of numerous

compounds in pollen in the absence of specific recellents, rather than by one or a few specific compounds.

Milne *et al.*, (1986) found that twenty returning pollen foragers with conspicuous pollen loads were collected at the entrance of each of 10 colonies and the Corbicular areas and relative volumes of the pollen pellets were measured for each metathoracic leg. The areas of the 382 Corbiculae measured ranged from 1.543 to 2.281 mm2 and pollen pellet volumes from 5.066 to 47.74 mm^3. Corbicular area and pollen pellet volumes were significantly correlated ($r = 0.131$, $n = 382$, $p < 0.0103$). The correlation was even greater for the 100 largest pairs of Corbiculae bearing pollen pellets more than 20 mm3 in volume ($r = 0.256$, $n = 100$, $p < 0.0095$). It was concluded that workers with large Corbiculae carry significantly larger pollen pellets than workers with smaller Corbiculae. Possible effects on colony honey yields are discussed.

Bobrzecki and Wilde (1989a) stated that experiments on pollen trapping were carried out in Poland, in 1981 –84 using bottom traps on multi-story hives at the time of nectar flows from winter rape or buck- wheat. Traps were kept on the hives for periods varying from 8 to 30 days, and the number of brood cells was assessed before and after trapping. Pollen trapping during the flow from winter rape stimulated brood rearing even when 2kg of pollen was taken from a colony, and this was more pronounced in weak colonies than in strong ones. Brood rearing decreased in colonies when traps were used for long periods, and during the flow

from buckwheat; it also decreased in very strong colonies that had contained large amounts of brood before trapping started. There were no significant differences between weak and strong colonies in the amounts of pollen trapped.

Bobrzecki and Wilde (1989b) showed that pollen trapping was carried out on hives in Poland during the second half of winter rape flowering and after it ended in the years 1981-84 and 1986. The number of colonies involved from 21 to 45. Divided into weak (group 2) and strong (group 3) colonies; group 1 colonies were controls without pollen traps. Mean figures (all years combined) showed that before trapping the number of brood cells was 16 423, 14 861 and 25 566 in-groups 1,2and 3 respectively; corresponding figures after trapping were 19 290, 23 024 and 26 086. The average amount of pollen trapped was 0.988 and 914 g in-groups 1,2 and 3 respectively; the corresponding figures for honey production were 14.5,12.7 and 17.0 kg. The results indicate that pollen trapping can be carried out on weak colonies as well as strong ones, without significantly affecting honey production, and it can have a positive effect on brood rearing. The results do not agree with those of some other reported studies, and it is pointed out that only short periods of pollen trapping (mean, 20.4 days) were involved.

Jyothi *et al.*, (1993) found that colonies of *Apis cerana indica* from different areas of Bangalore, India, were examined regularly for a year for the presence of *Neocypholaelaps indica*. The mites, which normally forage for pollen on Eucalyptus flowers, were found on foraging bees from all colonies throughout the year except

during May, June and July. Maximum infestation occurred between November and January, when Eucalyptus species were in flower. The presence of mites on foraging bees significantly reduced pollen loads from 5.97-7.67 mg on normal bees to 1.0-3.3 mg on infested bees.

C-Wax secretion activity,

Whitecomb (1946) estimated the comb building by adding frames with full sheets of foundation at regular intervals and found that the bees consume 5 lb. honey for producing 1 lb. wax.

Natsin (1951) remarked that by removing the wax secretion from the colony every 3 to 4 days, yielded wax by about 3:5 times as much as the continuous building of combs.

Orosi-Pal (1956) found that empty space in the hive stimulates the bees wax glands to greater development. From these spaces after removal of the honey which may be accumulated. Then the produced wax was weighed to determine the amount of wax produced.

Taranov (1959) showed that the bee wax production was determined by the distribution of free space in the hive.

Hoffmann and Werner-Meyer (1960) demonstrated that the need for building material was of great importance for the development of bees wax glands.

El-Barbary (1974) measured the wax secretion activity in the hives by arranging the brood and honeycombs in such a way, as to

leave gaps longer than the usual bee space, for the stimulation of comb building by bees. The wax produced was collected.

Stoner *et al.*, (1984) proved that honeybee colonies were exposed to 5 levels each of both emulsifiable concentrate (EC) and microencapsulated (ME) methyl parathion incorporated into the beeswax foundation of one frame in each 4- frame nucleus colony. Formulation type only had an effect at the highest concentration of methyl parathion (100 ppm) when ME killed more adult bees than EC. Foundation seeded with up to 10 ppm methyl parathion had no significant effects on the colonies. Colonies exposed to foundation containing 100 ppm had significantly less sealed brood, fewer frames of adult bees, less drawn comb on the treated foundation and more dead adult bees than the control group or other treatment groups.

D- Propolis gathering activity

Popeskovic *et al.*, (1981) found that results of this study suggest that bees (*Apis mellifera*) chambers with propolis tolerate suffocation markedly longer) than control bees. A comparative analysis of graphs during the experiment while bees were being asphyxiated indicates a content in chambers lined with propolis.

Iannuzzi (1983) showed that covers the medicinal uses and collection from honey bee (*Apis mellifera*) hives of propolis, or "bee glue"

Johnson *et al.*, (1994) stated that bee propolis is a sticky amalgamation of plant resins collected by honeybees (*Apis mellifera*

L.) and used in the hive for filling cracks and repairing combs. Propolis contains a diversity of compounds of plant origin, and is reported to have medicinal, antimicrobial, insecticidal, and phytotoxic properties. They examined the physical and chemical composition of North American samples of bee propolis from several sites in North America and tested for bioactivity against larvae of the greater wax moth (*Galleria mellonella* L.), a common apiary pest. The amount of methanol-extractable resin in samples from Ohio and Georgia ranged from 24% to 79% by weight. Propolis collected from hives in Ohio was more chemically diverse (over 30 compounds detected by paper chromatography) than material from South Georgia (fewer than 10 major compounds) and contained a lower proportion of methanol-insoluble beeswax. The paper chromatographic surveys revealed little variation in the chemical profile of specific hives over a six-month period and no differences between propolis from adjacent hives. Four flavonoids were identified from propolis Collected in Ohlo: kaempferol, galangin, 3,3'-dimethoxyquercetin and 3-methoxykaempferol. When mixed into artificial diet, fractioned propolis reduced larval growth of the greater wax moth, but not dramatically. An array of phenolics reported from propolis (caffeic acid, chrysin, ferulic acid, galangin, kaempferol, and quercetin) were bioas individually for effects on larvae, but none reduced larval growth at the concentrations tested, suggesting that wax moths are tolerant of some phenol their diet

Mahran *et al.*, (1996) found that the protective effect of honeybee aqueous propolis extract (APE) against the hepatotoxicity of carbon tetrachloride was investigated using isolated liver-cell suspensions as the experimental model. Various concentrations of the extract were preincubated with the hepatocyte suspensions for 30 win before being subjected to the hepatotoxin for a further 30-min. The hepatocyte toxicity was assessed using three parameters, namely, the release of lactate dehydrogenase, the formation of lipid peroxides and the depletion of intracellular reduced glutathione. It was found that a dose-related protection against the induced cell injury was conferred by APE as evidenced by its inhibitory influence on the changes induced by CCI sub (4) on the measured parameters. The hepatocyte protective effect of APE is probably a result of its antioxidant and free-radical-scavenging properties which in turn help to maintain the intracellular level of reduced glutathione.

Bevilacqua *et al.*, (1997) proved that incense is a hardened rubbery resin that runs from subtropical plants; propolis is a resinous, rubbery and balsamic substance collected by bees from the buds of trees. These two substances have common origins and composition and their content may differ, depending on plants from which they are collected by humans man or bees; terpenes are prevalent in incense; flavanoids, aromatic acids and esters in propolis. The use of incense and propolis for the treatment of human and animal diseases has been well-known since the earliest times In a previous report we demonstrated that the diffusion of

incense and propolis can reduce the bacterial load in a school classroom; on this basis, they evaluated the effectiveness of incense and propolis in reducing the bacterial load in other two closed environments, that is a pig and a poultry farm. After spreading propolis in these two environments, the number of colony forming units in the samples collected both from the pig farm and the poultry farm was significantly lower. A further reduction in the bacterial load was relieved, when propolis and incense were used together. On the basis of these preliminary data, we conclude that propolis (especially when containing a high concentration of sesquiterpenes) and incense can be employed in zootechnology, to sanitise the closed environments of breeding farms.

Koo *et al.*, (1997) proved that the quality and quantity of flavonoids from two types of propolis collected by two different varieties of *Apis mellifera* bee in the same region were investigated. There was found a remarkable quantitative and qualitative difference of flavonoids in propolis. These results indicate that the chemical composition of propolis was dependent on the variety of the bee.

Menezes *et al.*, (1997) showed that crude propolis and commercial products containing propolis, such as ethanolic extracts, tablets, capsules and powders acquired in Sao Paulo City (Brazil) were analyzed. The resins of the solid products were extracted with ethanol and found to be present at various concentrations, independently of the propolis concentration specified on the label of

the commercial products. The in vitro activity of these resins against *S. aureus, B. cereus* and *B. subtilis* was also determined. The results showed that the antibacterial activity rather than the propolis concentration itself should be considered for quality control and that some resins are likely to display a species-specific action.

MATERIALS AND METHODS

These works for studying the activities of honeybee colonies in El-Arish region, the apiary is located at the Faculty of Environmental Agriculture Sciences, El-Arish, Suez Canal University. This country is distance of 365 km far from Cairo, its desert lies at a latittuite of the east of Egypt.

The our experiments carried out during the seasons of 1996 and 1997. The following points were investigated:

1- Ecological condition at El-Arish (Table,1)
2- Surveys for cultivated and wild plants and trees which are the sources of pollen, nectar, and propolis for honeybee activity. El-Arish region.
3- Survey and identification for pollen grains which were gathered by honeybee colonies at El-Arish region.
4- The activity of honeybee colonies with the reference to the brood rearing at El-Arish region, and the honey may be yielded during a year of study.

For studying the effect of some ecological factors on the activity of honeybee colonies; this experiments were carried out in the apiary of honeybee research center of faculty of environmental agriculture sciences, El-Arish Suez Canal University.

Pollen Gathering Activity:

Trapping of pollen grains colonies representing the average standard strength of colonies in the apiary were used for this experiment. Trapping pollen was started from January till December 1996.The used traps use were similar to those used by **Farrar (1934)** and **Percival**

(1955) and with the same idea of those suggested by **Synge (1947), Rahad (1957), Free (1970), Khattab (1976)** and **El-Bassiouny (1989). (Fig. 1)** in this studies, in the present work 10 colonies were used for pollen stored measurements and the obtained date were recorded during the period activity. Pollen areas were measured at 13 days intervals from July 1996 until the end of June 1997.

The traps were emptied every day. The pollen grains were sorted according to the colour texture, the size and the shape. A representative sample of each type of major source was mounted on slides and examined microscopically for identification.

For pollen identification representative sample of each type of pollen was mounted in glycerin jelly, and compared with prepared slides of the flowering plants growing in El-Arish region. This procedure was suggested by **Hodges (1952), Hyde and Adams (1958), Khattab (1976).**

Technical methods for pollen grains photography and identification:

All pollens preparation were described, Gently removed from the newly opened anther, from hind legs of honeybees worker which trapped on flowers and from the pollen traps attached on the hives. The pollen sample was put directly on the slide as described by **Wodehouse (1935)**, after being deffatted with a needle the grains have been mounted with glycerin jelly containing basic fuchsin as a stain. It necessary to use only just enough jelly to occupy the space beneath the coverslip without under pressure being applied otherwise either the film is too thin and they are liable to be flattened and so distorted. Different kinds of pollen vary in

their capacity to absorb stain, and the depth of colour attained by grains any particular kind varies according to their density on the slide.

The optical system used in taking the majority of the photographs was a light microscope fitted with Exacta Reflex Camera **(Khattab,1976 and El-Bassiouny,1989)**. All the photographs have been taken at a magnification of 800 diameters.

a)- Brood rearing activity:

It was planed to study the brood rearing activity under the environmental condition of El-Arish. In this experiment, ten honeybee colonies, nearly similar in strength, were used. These colonies contains enough stored food and in the number of combs covered with bees, the colonies were placed in the apiary randomly.

For evaluating the brood rearing activity of the treated colonies, sealed brood areas were measured in square inches, at 13 days intervals, starting from July 1996 until the June 1997 **(Khattab, 1976)**. Sealed brood areas counted by means of Hoffman frame (Langstroth size) divided into squares inches by wire intersecting curves **(Rashed and Parker, 1958a)**.

b)- Pollen Gathering Activity:

Pollen sources in the area as well as the pollen gathering activity were studied also.

The pollen traps were placed at the hive entrances of the experimental colonies. The traps used were similar in idea to those used by **Rashed (1957), Free (1970),** and **Khattab (1976),** however, they differ in that the wire double was substituted by a metal sheet punctured making small holes (5 holes per inch) with diameter, which will allow

honeybee workers just to pass, yet it will scrape-off the pollen loads carried in the pollen baskets of their hind legs. The pollen loads will fall through a horizontal wire-double screen into the collecting tray which could be emptied as required.

The efficiency of the trap was tested by counting 100 bees from each hive entering with pollen loads on their hind legs through an empty trap. The number of loads that fall in the tray was counted, and thus the efficiency was calculated as the percentage of pollen loads to the number of entering bees. Pollen trapping used in the experimental from 1st July 1996 until the end of June 1997. The traps were emptied every day and the contents were weighed.

The pollen loads were classified according to colour, texture, and size shape. For identification a representative sample of each type of pollen was mounted in glycerin jelly containing basic fuchsin, and compared with prepared slides of pollen made from newly opened anthers of flowering plant growing in El-Arish region. This procedure was suggested by **Hodges (1952)** and **Hyde *et al.*, (1958).**

c)- Wax Secretion Activity:

In these study ten colonies of honeybee were used, the experimental began from July 1996 until June 1997. The colonies were arranged in the first five days of each month and the empty combs were removed during the experiment study. During the five days of the experiment, two foundation sheets were added daily and removed after 24 hours from each colony. The amount of secreted wax was estimated by weight the foundation sheets as well as the empty frames before placing and after removal from the colony **(Khattab, 1976)**.

d)- Propolis Gathering Activity:

In these experiments ten honeybee colonies were used for propolis production during the period from July 1996 to June 1997. The commercial production of propolis is usually a difficult and time-consuming operation. To obtain the highest grade and crude of propolis special frames consist from plastic screens inserts are usually placed on over the combs in the hive. The inserts provide spaces that mimic holes or cracks in the hive, and collected also form place natural inside honey bee hive thereby encouraging the bees to hill them with propolis. The resultant propolis is then collected, stored and packaged. Hives scrapings, though an easier way to obtain propolis, are often contaminated with wood chips, wax and paint and are of lower commercial quality **(Iannuzzi, 1983, 1990a)**.

The means of temperature degrees, relative humidity, and wind in El-Arish region, North Sinai governorate, during this study was recorded in **Table (1).**

Fig. (1): pollen trap

Table (1): Temperature, humidity and wind during the year (from July 1996 to June 1997).

Months	Temperature (°C)	Humidity (%)	Wind (m/sec)
July 96	30.80	66.05	7.80
August 96	28.30	65.04	9.30
September 96	25.70	64.08	9.10
October 96	21.80	64.08	8.10
November 96	18.60	68.06	7.00
December 96	15.10	66.40	7.00
January 97	13.46	70.70	7.61
February 97	11.91	67.04	9.80
March 97	14.02	66.60	11.83
April 97	17.14	62.60	12.10
May 97	20.97	67.31	0.96
June 97	24.39	68.80	1.02

RESULTS AND DISCUSSION

1- Ecological conditions at El-Arish region:

El-Arish town, the capital of north Sinai governorate Egypt is located at a distance about 32km. Far from El-Sheik Zuwaied and 48km. Far from Rafah.

Apiary of Honeybee research center of faculty of Environmental Agricultural Sciences, consisted of 50 colonies, they housed in langstroth hives.

The apiary was surrounded by cultivated land planted with many different plants, throughout the year. The most important sources of nectar producing crops, which are main nectar, flow seasons. The crops of nectar flow are *Prunus anyadalus* L; *Prunus armeniaca* L., Sheikh Zowayed peach Var., Nectarine, Earligrand peach var. *Pyrus communis*, *Malus domestica* L., *Persea americana*, *Eucalyptus globosus* and wild weeds. **(Khattab, 1976, 1987 and El-Bassiony, 1989)**.

Besides these main sources these are some minor sources to yield both nectar and pollen throughout the year because of suitability of climatic and agricultural conditions, which allow continuous growing of plants and workers foraging.

The main sources of pollen were **Table (2,3,4,5)** and **Figures** (from 2 to **67**) indicated the monthly sources of pollen and nectar plants, which were observed throughout a year of study, these trees and plants are found in the region of El-Arish during two years of study.

Table (2) Ornamintal plant observed and surveyed at El – Arish areas

MONTHS

Scientific name	Family	Jan	Feb	Mar	Apr	May	July	June	Augst	Sept	Oct	Nov	Dec	Fig
Eucaluptus globosus	Myrtaceae	+	+	+	+	+	+	+	-	-	-	-	-	2
Gazania splendens	Compositae	-	-	+	-	-	-	-	-	-	-	-	-	3
Ipomoea paniculata	Convolvulaceae	+	+	+	+	+	+	+	+	+	+	+	+	6
Hibiscus sinensis	Malvaceae	+	+	+	+	+	-	-	-	-	-	-	-	11
Dimorphotaca echionis	Compositae	-	-	+	+	-	-	-	-	-	-	-	-	13
Matthiola pumila	Crucifera	-	+	+	+	-	-	-	-	-	-	-	-	14
Chrysanthemum coronarium	Compositae	+	+	+	-	-	-	-	-	-	+	+	+	15
Tropaeolum majus	Tropaeolaceae	+	+	+	+	-	-	-	-	-	-	-	-	16
Pelargonium zonale	Geramiaceae	+	+	+	-	-	-	-	-	-	+	+	+	17
Pelargonium odoratismium	Geramiaceae	+	+	+	+	-	-	-	-	-	+	+	+	18
Myoporum pictum	Boraginaceae	+	+	+	+	-	-	-	-	-	+	+	+	19
Lantana comara	Verbenaceae	+	+	+	+	-	-	-	-	-	+	+	+	20
Dianthus SP.	Caryophyllaceae	+	+	+	+	-	-	-	-	-	+	+	+	24
Antirrhinum majus	Scrophklaraceae	-	+	+	+	-	-	-	-	-	+	+	+	25
Nerium oleander	Apocyonacae	+	+	+	+	+	-	-	-	-	+	+	+	26
Gaillardia pulehlla	Compositae	-	-	+	+	-	-	-	-	-	-	-	-	29
Thevetia peruviana	Apocyanaceae	+	+	+	+	-	-	-	-	-	-	+	+	30
Anethum gravegles	Umbellifeae	+	+	+	+	-	-	-	-	-	+	+	+	31
Asparagus SP.	Liliaceae	-	+	+	+	+	+	-	-	-	-	-	-	35
Vinca rosea	Apocynaceae	+	+	+	-	-	-	-	-	+	-	+	+	46
Jasminum grnadiflorum	Oleaceae	-	-	+	+	+	+	+	+	+	-	-	-	47
Jasminum sambac	Oleaceae	-	-	+	+	+	+	+	+	+	-	-	-	48
Callistemon ericifolia	Myrtaceae	-	-	-	+	+	+	+	-	-	-	-	-	53
Hibiscus rosasinensis	Malvaceae	-	+	+	+	+	-	-	-	-	-	-	-	54
Caesalpinia pulcherrima	Leaguminosae	-	-	+	+	+	+	-	-	-	-	-	-	56
Tagetes erecta	Compositae	-	-	+	+	+	+	+	+	+	+	-	-	59
Cassia occidentaeis	Leguminosae	-	-	-	-	+	+	+	+	-	-	-	-	65
Bougainvillea glabra	Nyctaginaceae	+	+	+	+	+	+	+	+	-	-	-	-	66

Table (3) Wild weeds observed and surveyed at El – Arish areas

Scientific name	Family	Jan	Feb	Mar	Apr	May	June	July	Augst	Sept	Oct	Nov	Dec	Fig
Solanum nigrum	Solanaceae	+	+	+	+	-	-	-	-	-	+	+	+	7
Convolvulus arvensis	Convolvulaceae	-	+	+	+	+	+	+	+	-	-	-	-	8
Heliotropium luteum	Boraginaceae	+	+	+	+	-	-	-	-	-	+	+	+	9
Reichardia Tingitana	Compositae	+	+	+	+	-	-	-	-	-	+	+	+	10
Nicotiana glauca	Solanaceae	+	+	+	+	-	-	-	-	-	+	+	+	12
Senecio sp.	Compositae	+	+	+	+	-	-	-	-	-	+	+	+	21
Senecio desfontainei	Compositae	+	+	+	+	-	-	-	-	-	+	+	+	22
Papaver rhoeas	Papaveraceae	-	-	+	+	-	-	-	-	-	-	-	-	23
Datura stramonium	Solanaceae	+	+	+	+	-	-	-	-	-	+	+	+	27
Plantago albicams	Plantaginaceae	-	+	+	+	-	-	-	-	-	+	+	-	28
Pancratium maritimum	Amaryllidaceae	-	+	+	+	-	-	-	-	-	-	-	-	32
Cynodon dactylon	Poceae	+	+	+	+	+	+	+	-	-	+	+	+	33
Alhagi maurorum	Leguminoseae	-	+	+	+	-	-	-	-	-	-	-	-	34
Sesbania sesban	Leguminosae	-	+	+	+	-	-	-	-	-	-	-	-	36
Centaurea ceneraria	Compositae	-	+	+	+	-	-	-	-	-	-	-	-	44
Solanum eleganiaefolium	Solanaceae	+	+	+	+	-	-	-	-	-	-	-	+	52
Hyoscyamus muticus	Solanaceae	-	+	+	+	+	-	-	-	-	-	-	-	55
Lippia modiflora	Verbenaceae	+	+	+	+	+	+	+	+	+	+	+	+	60
Gastrocotyle hispida	Boranginaceae	–	–	–	–	–	+	+	+	+	–	–	–	63
Mesembryanthemum forskalei	Aizoaceae	-	-	+	+	+	-	-	-	-	-	-	-	67

Table (4) Crops (crops + vegetable plants) observed and surveyed at El – Arish region during a year of study

Scientific name	Family	Jan	Feb	Mar	Apr	May	June	July	Augst	Sept	Oct	Nov	Dec	Fig
Medicago sativa	Lrguminosae	+	-	-	-	-	-	-	-	-	-	-	+	4
Vicia faba	Leguminsoae	+	+	+	-	-	-	-	-	-	-	-	+	5
Solanum melongenna	Solanaceae	-	+	-	-	-	-	-	-	-	-	-	-	45
Eruca sativa	Graminae	-	-	-	+	+	+	+	+	+	+	+	-	50
Cucurbita pepo	Cucurbitaceae	+	+	+	+	+	+	+	+	+	+	+	+	51
Ricinus communis	Euphorbeaceae	-	-	-	-	+	+	+	+	+	+	+	+	57
Luffa cylindrica	Cucurbitaceae	-	-	-	-	+	-	-	+	-	+	-	-	58
Zea mays	Graminae	-	-	-	-	-	+	+	-	-	-	-	-	62

Table (5) Fruiting trees observed and surveyed at El – Arish areas during a year of study

Scientific name	Family	Jan	Feb	Mar	Apr	May	June	July	Augst	Sept	Oct	Nov	Dec	Fig
Prunus domestica	Rosaceae	-	+	+	-	-	-	-	-	-	-	-	-	37
Prunus amygdalis	Rosaceae	-	+	+	-	-	-	-	-	-	-	-	-	38
Prunus armeniaca	Rosaceae	-	+	+	-	-	-	-	-	-	-	-	-	39
Citrus maxima	Rutaceae	-	+	+	-	-	-	-	-	-	-	-	-	40
Citrus Sineniss	Rutaceae	-	+	+	-	-	-	-	-	-	-	-	-	41
Citrus aurantium	Rutaceae	-	+	+	-	-	-	-	-	-	-	-	-	42
Phoenix dactylifera	Plamacea	-	+	+	+	+	-	-	-	-	-	-	-	43
Olea europea	Oleaceae	-	-	-	+	+	-	-	-	-	-	-		49
Pyrus communis	Rosaea	-	-	-	-	-	+	+	-	-	-	-	-	61
Pyrus malus	Rosaea	-	-	-	-	-	-	+	-	-	-	-	-	64

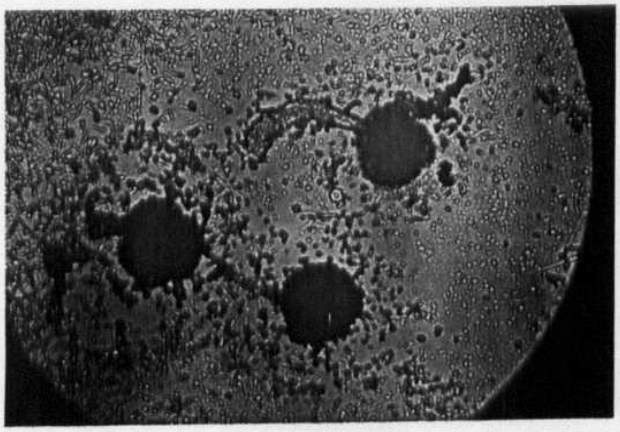


Fig. (2): Pollen grains of ***Eucalyptus globosus***.

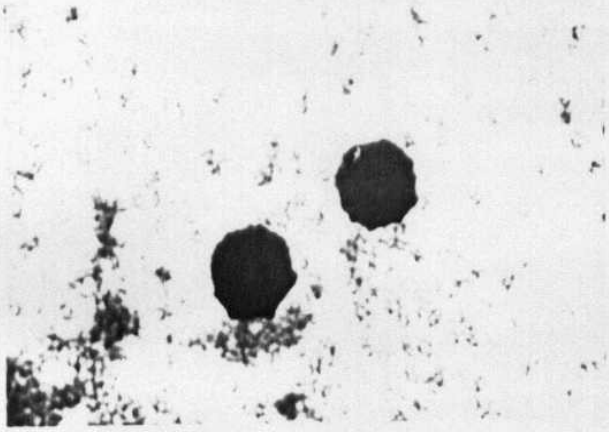


Fig. (3): Pollen grains of ***Gazania splendens***.

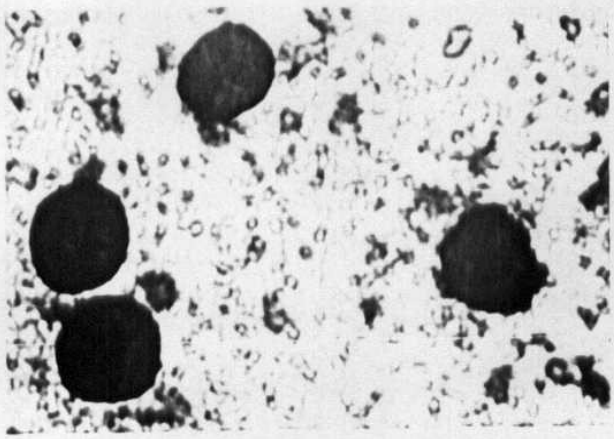


Fig. (4): Pollen grains of ***Medicago sativa***.

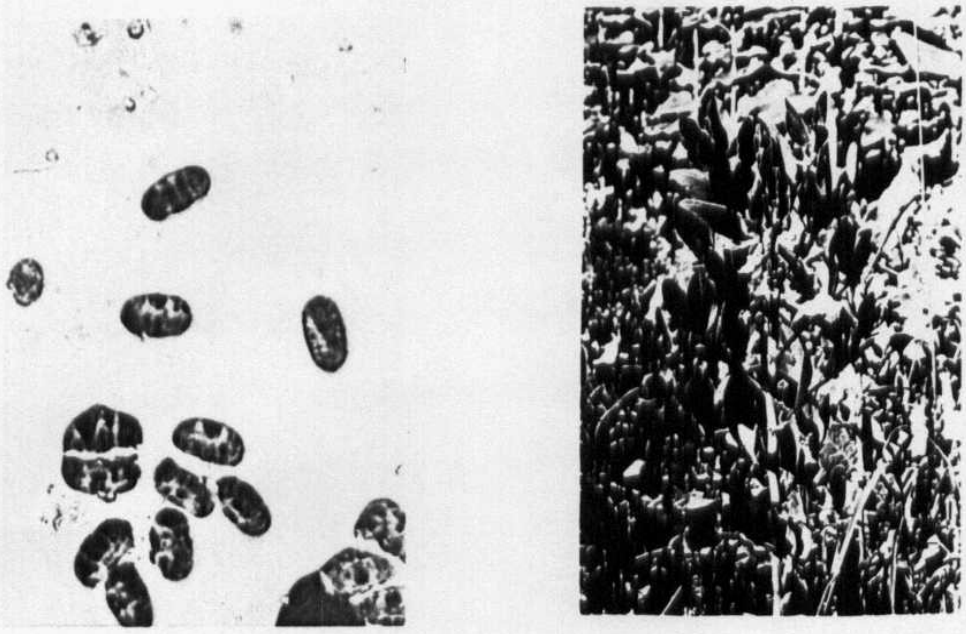


Fig. (5): Pollen grains of *Vicia faba*.

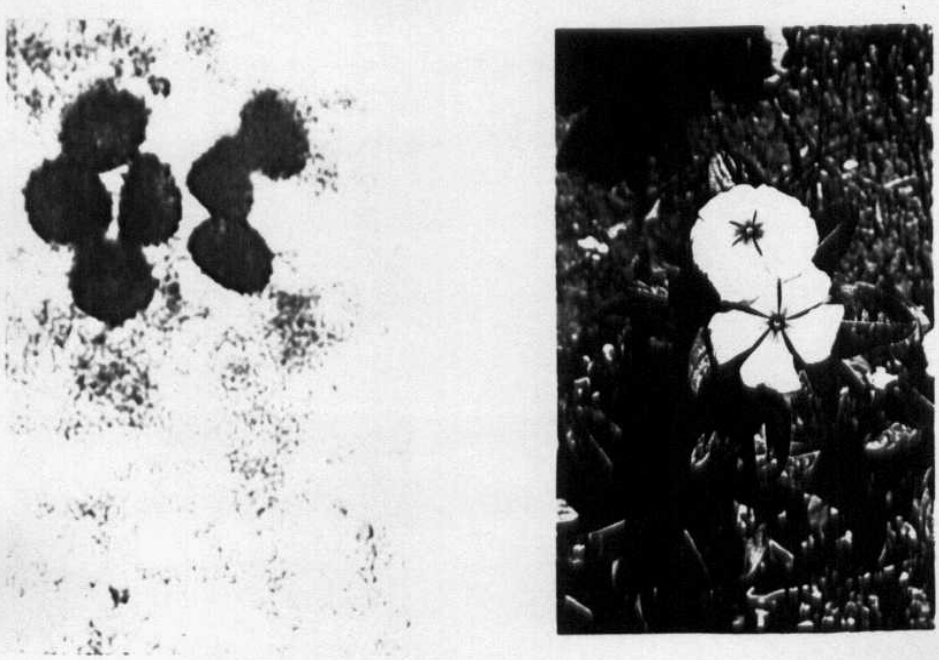


Fig. (6): Pollen grains of *Ipomaea pinculata*.

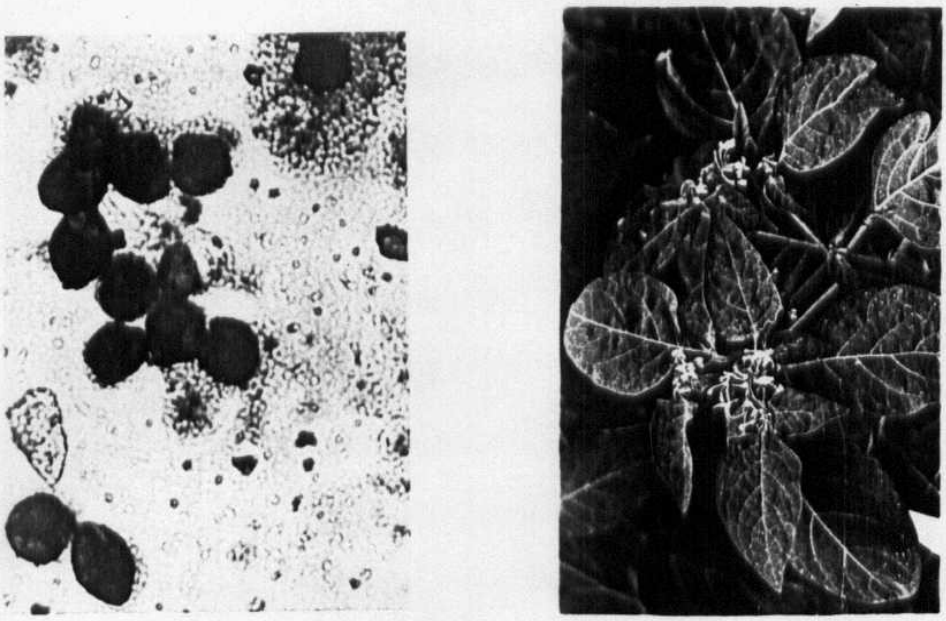


Fig. (7): Pollen grains of *Solanum nigrum*.

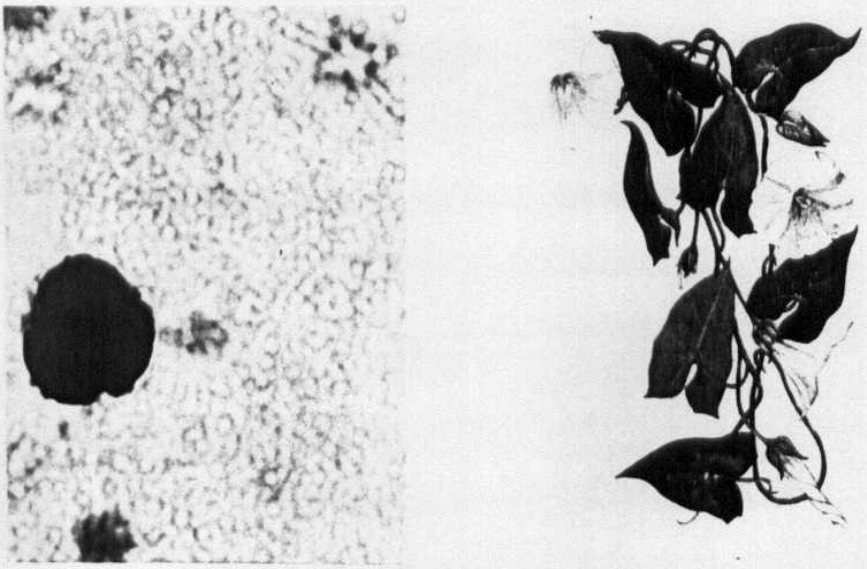


Fig. (8): Pollen grains of *Convolvulus arvensis*.

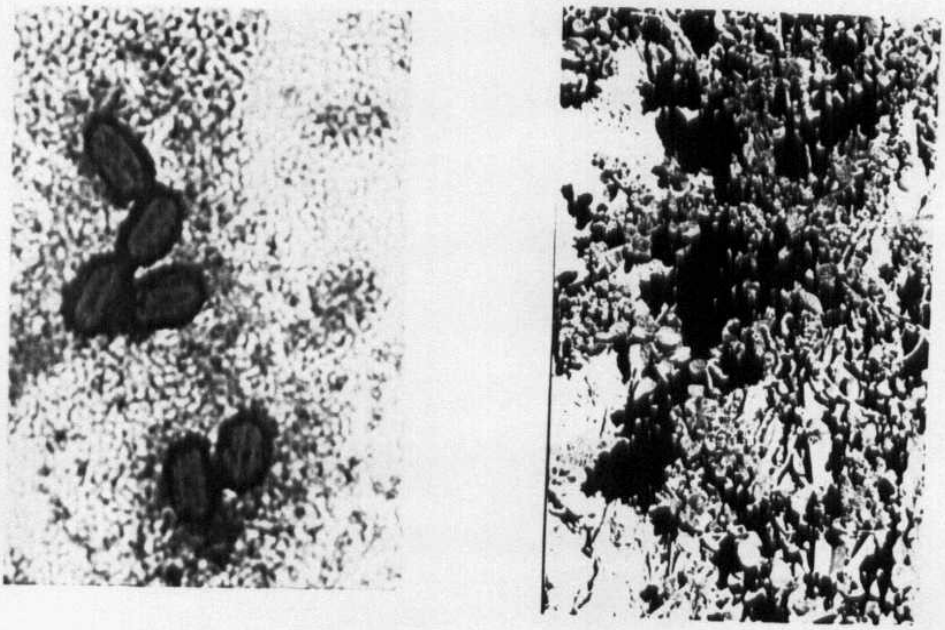


Fig. (9): Pollen grains of *Heliotropium luteum*.

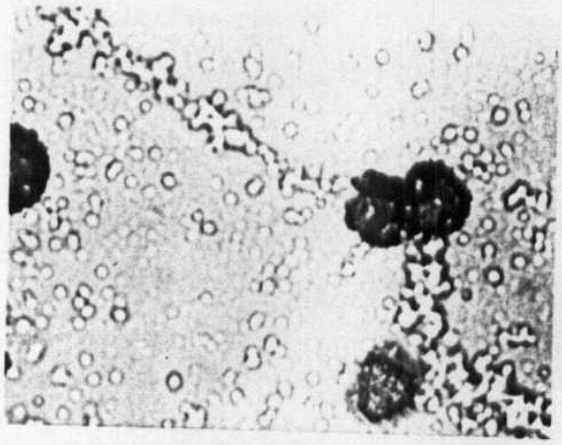


Fig. (10): Pollen grains of *Reichardia tingitana*.

Fig. (11): Pollen grains of *Hibiscus sinensis*.

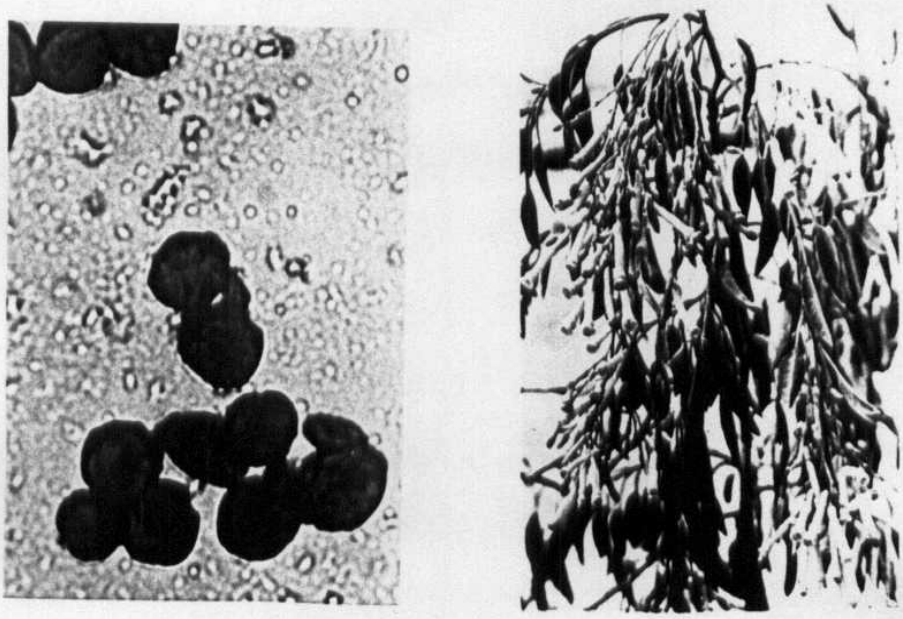


Fig. (12): Pollen grains of *Nicotiana glauca*.

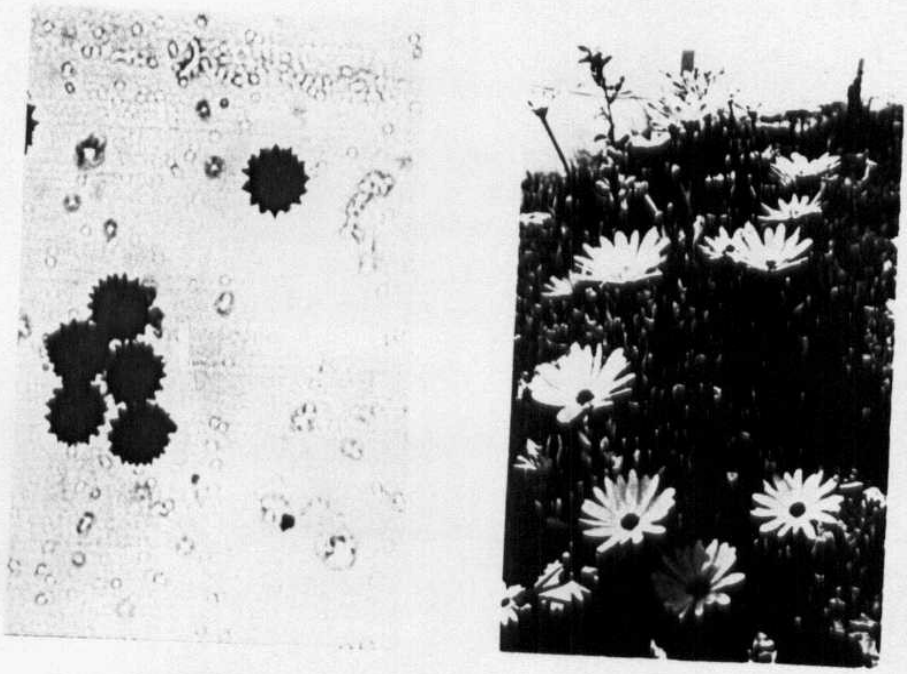


Fig. (13): Pollen grains of ***Dimorphteca echionis***.

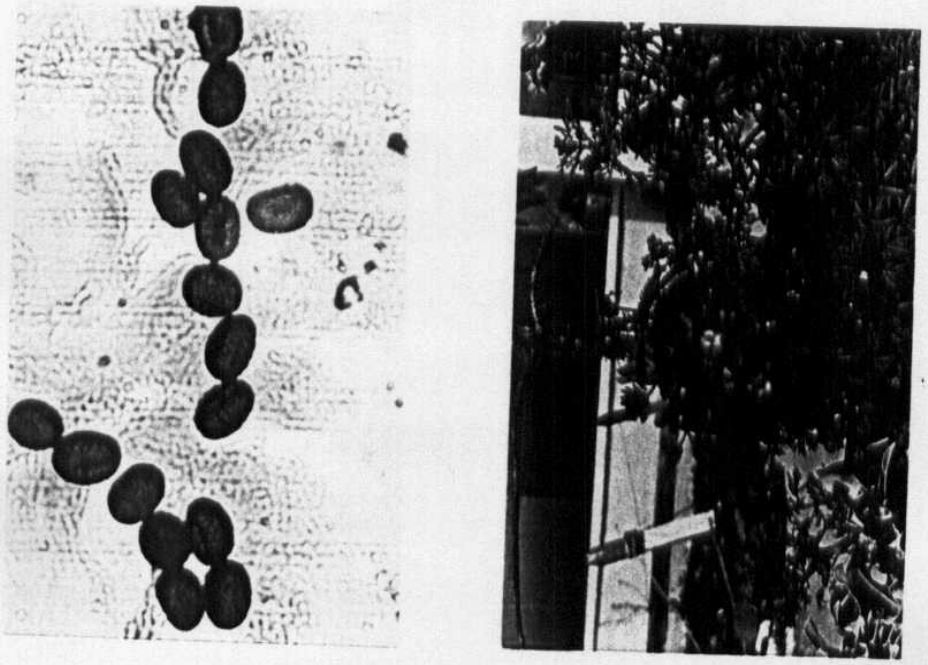


Fig. (14): Pollen grains of ***Mathiola pumila***.

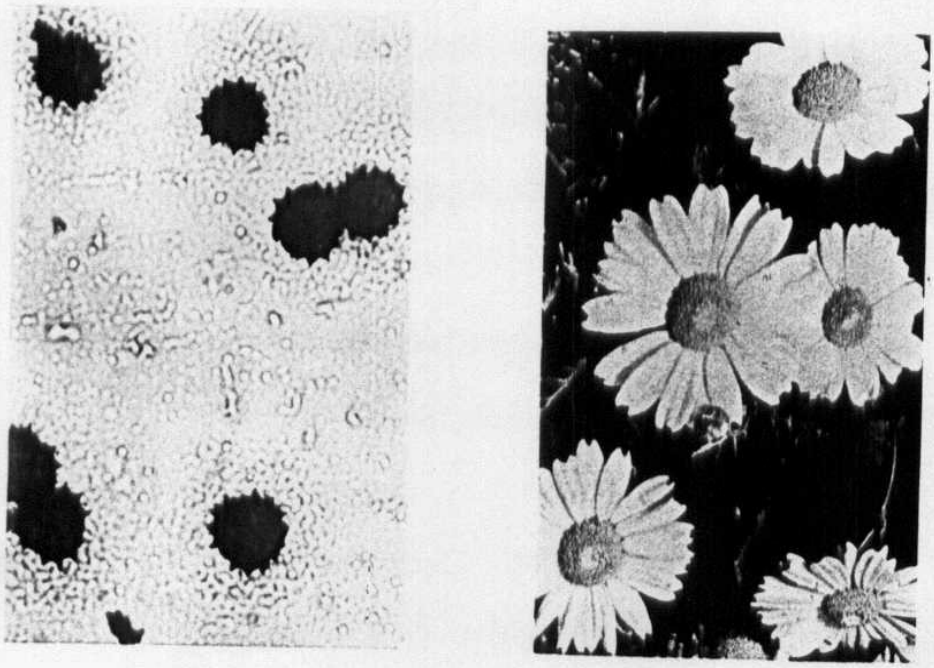


Fig. (15): Pollen grains of ***Chrysanthmum coronerium*** **Bocc**.

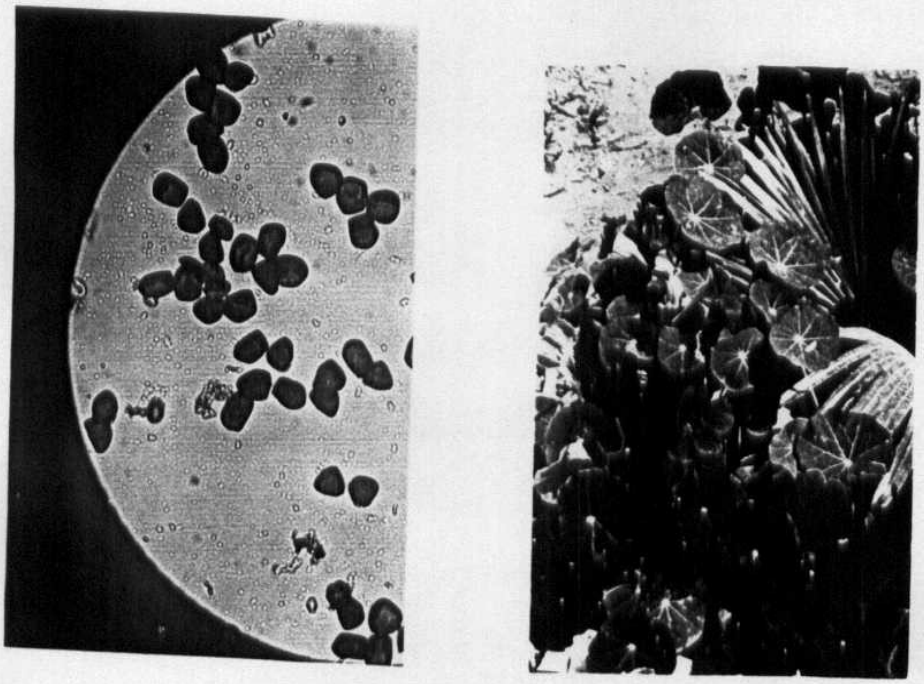


Fig. (16): Pollen grains of ***Tropaelum majus***.

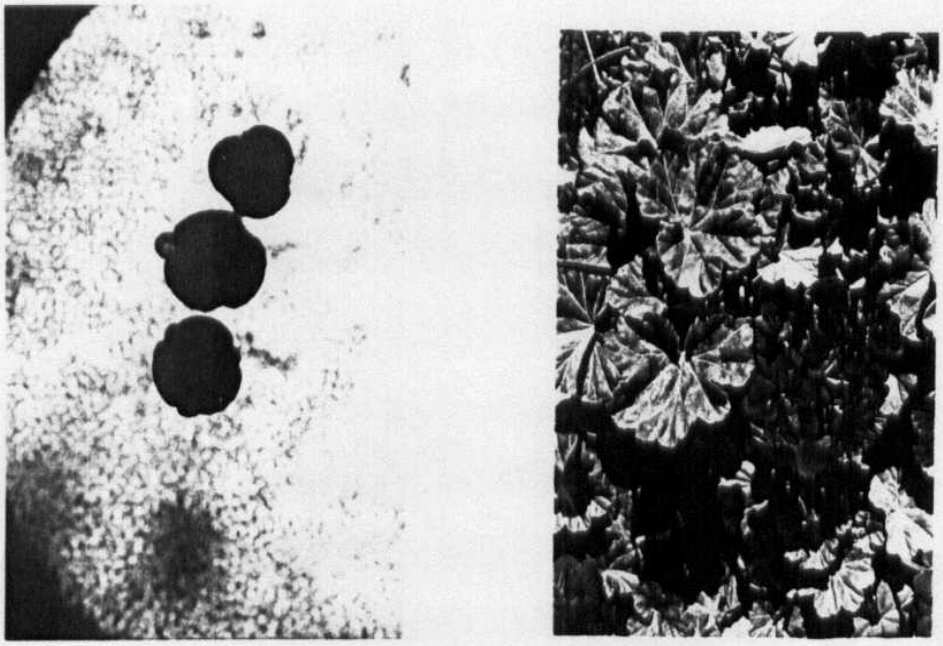


Fig. (17): Pollen grains of ***Pelargonium zonale***.

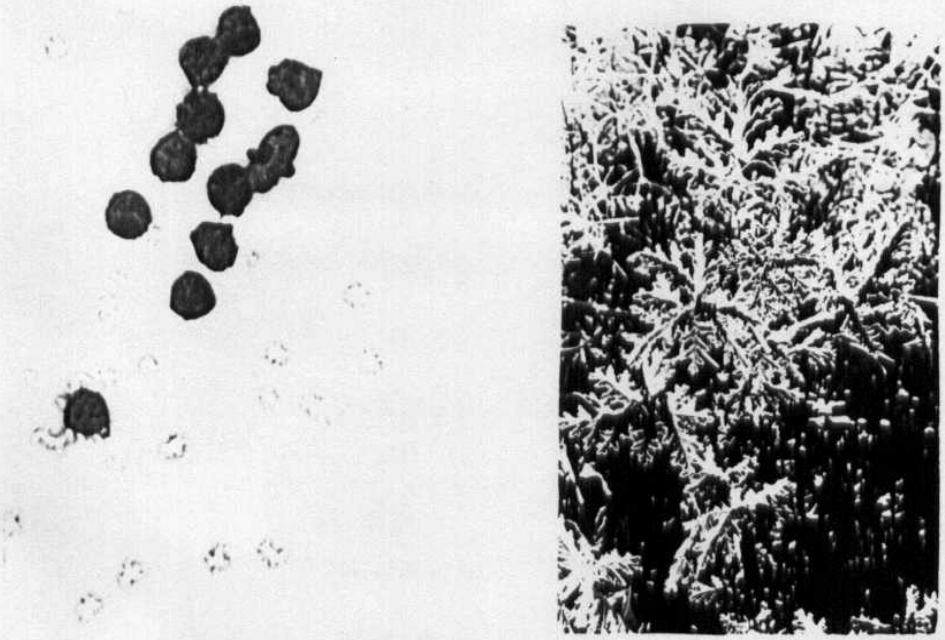


Fig. (18): Pollen grains of ***Pelargonium odoratissmum***.

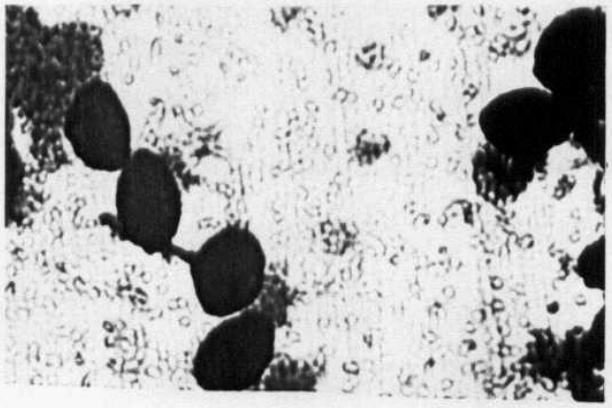


Fig. (19): Pollen grains of ***Myoporum pictum***.

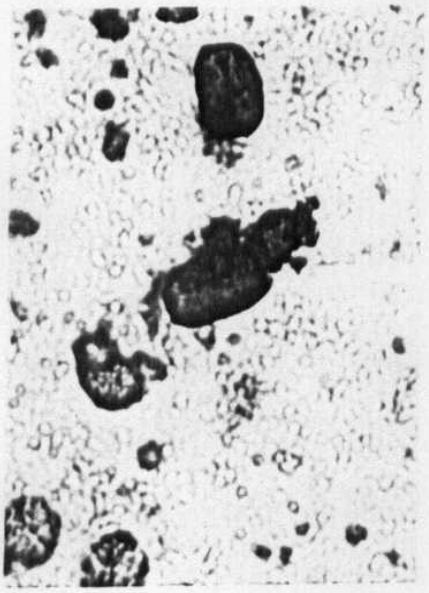


Fig. (20): Pollen grains of ***Lantana camara***.

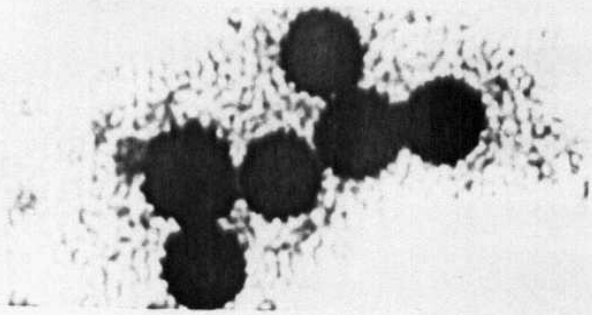


Fig. (21): Pollen grains of *Senecio sp.*.

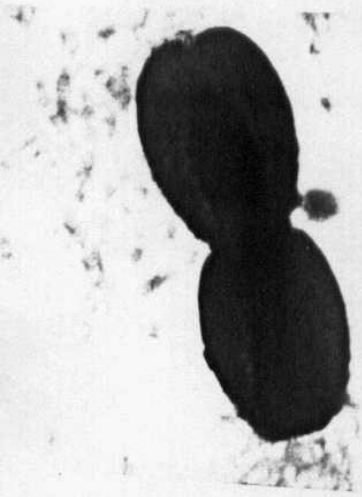


Fig. (22): Pollen grains of ***Senecio desfontainei***.

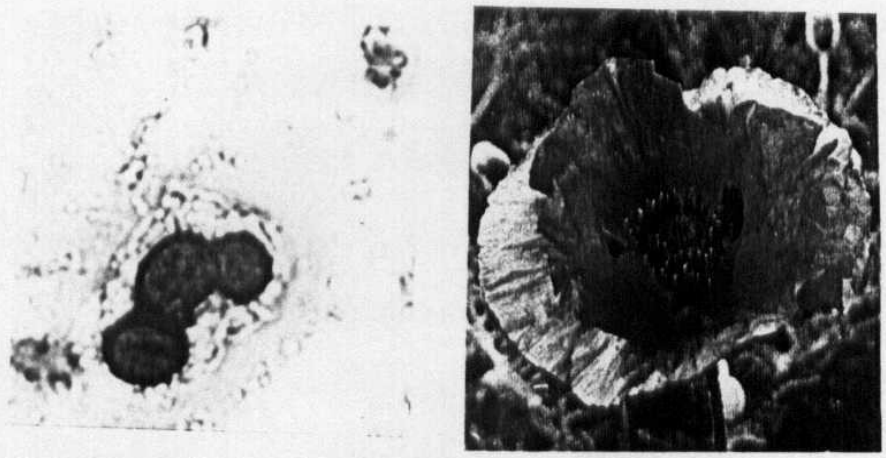


Fig. (23): Pollen grains of ***Papaver rhoes***.

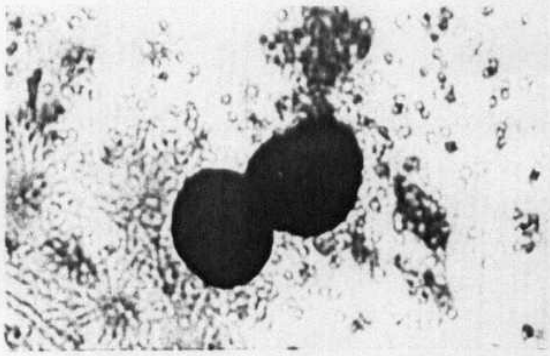


Fig. (24): Pollen grains of ***Dianthus sp***.

Fig. (25): Pollen grains of ***Antirrhnum majus***.

Fig. (26): Pollen grains of *Nerium oleander*.

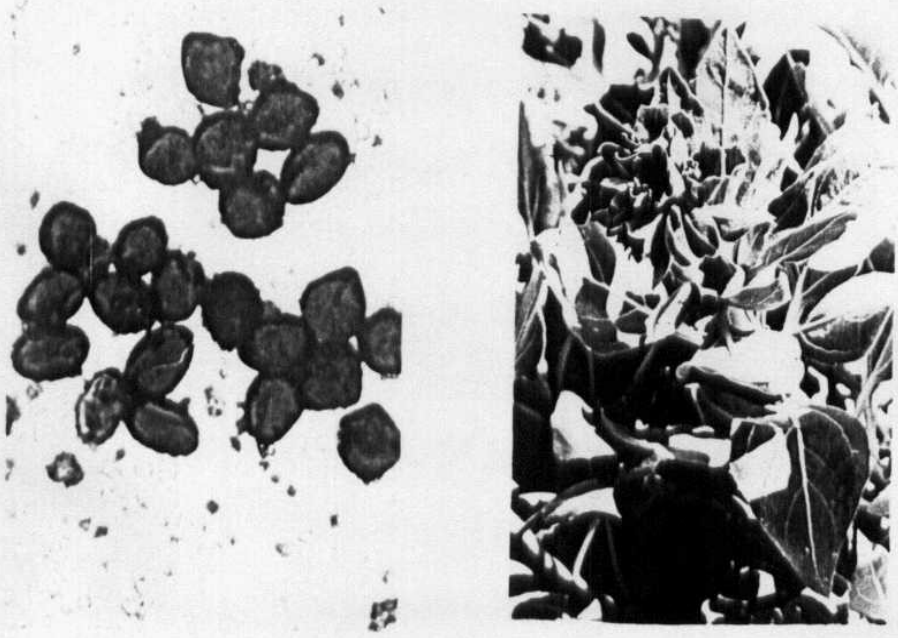


Fig. (27): Pollen grains of *Datura stramonium*.

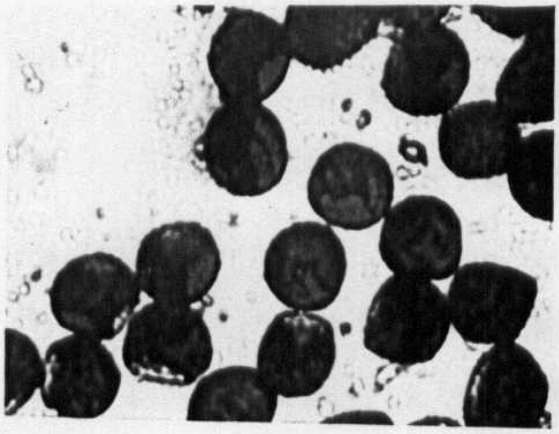


Fig. (28): Pollen grains of *Plantago albicens*.

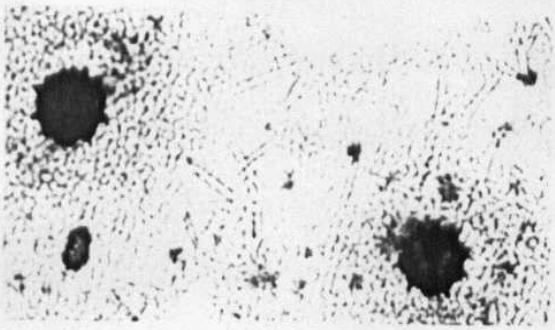


Fig. (29): Pollen grains of *Gaillardia pulehlla*.

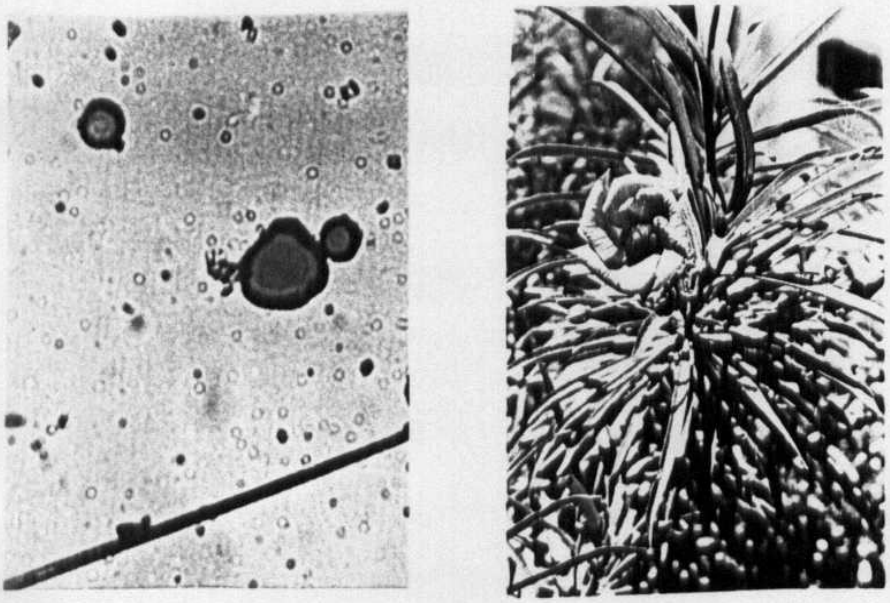
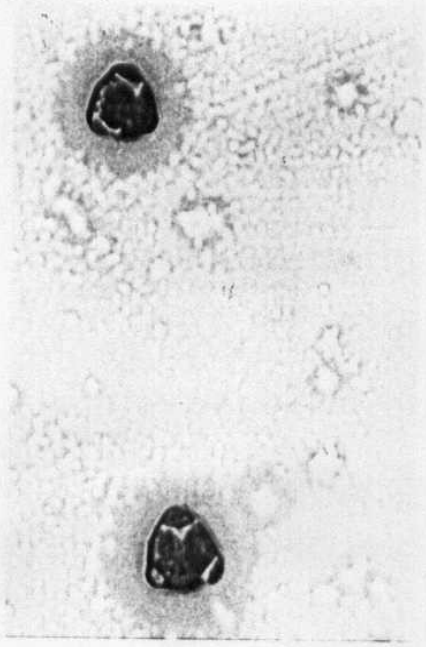


Fig. (30): Pollen grains of *Thevetia peruviana*.



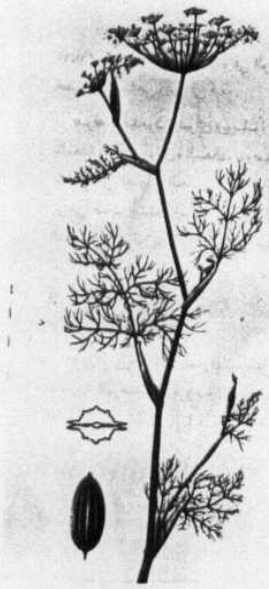


Fig. (31): Pollen grains of *Anethum graveolen*.

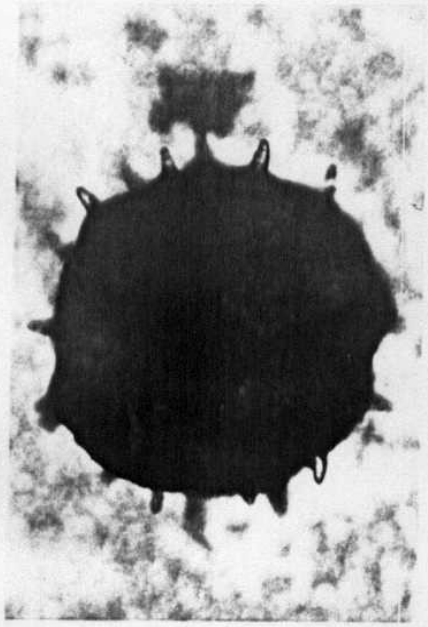


Fig. (32): Pollen grains of *Pancratium maritimum*.

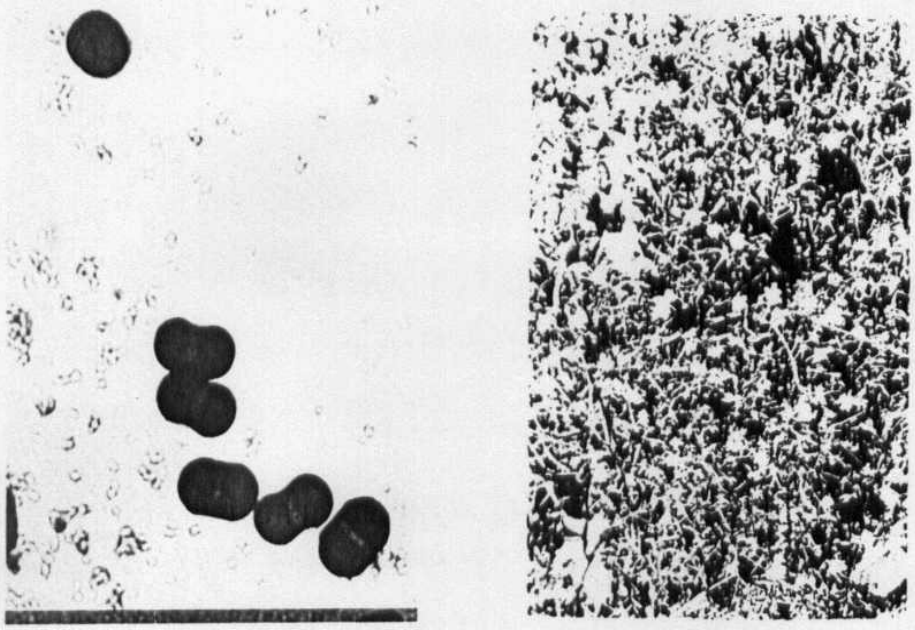


Fig. (33): Pollen grains of *Cynodon dactylon*.

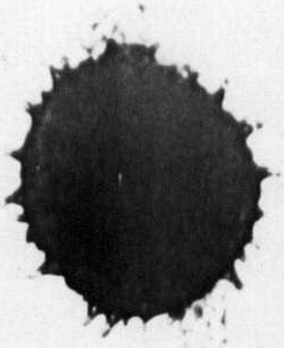


Fig. (34): Pollen grains of *Alhagi maurorum*.

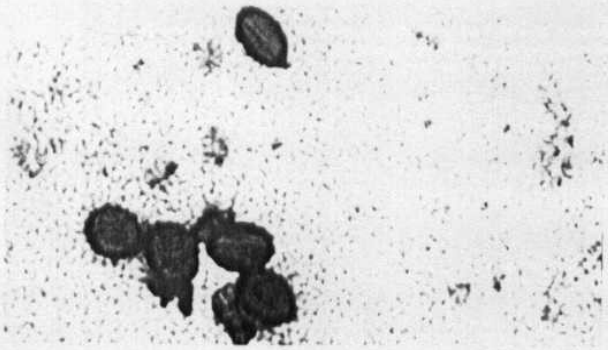


Fig. (35): Pollen grains of *Asparagus officinalis*.

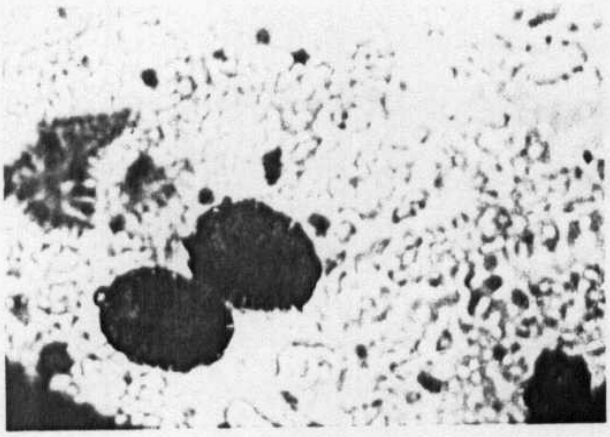


Fig. (36): Pollen grains of *Sesbania sesban*.

Fig. (37): Pollen grains of *Prunus domestica*.

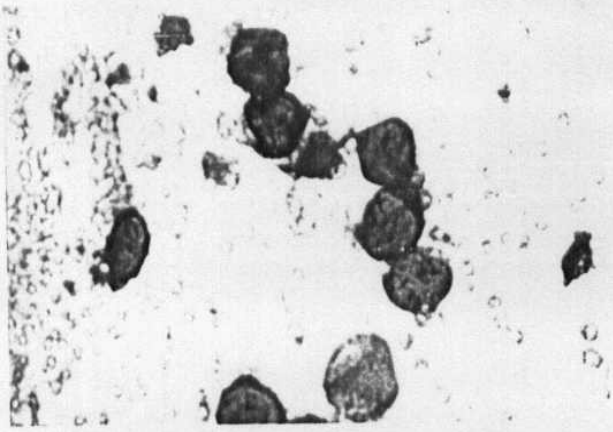


Fig. (38): Pollen grains of *Prunus amygdalis*.

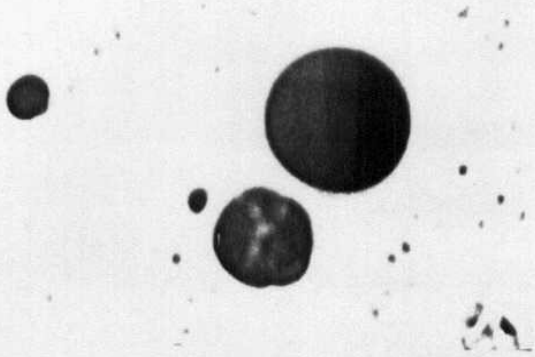


Fig. (39): Pollen grains of ***Prunus armeniaca***.

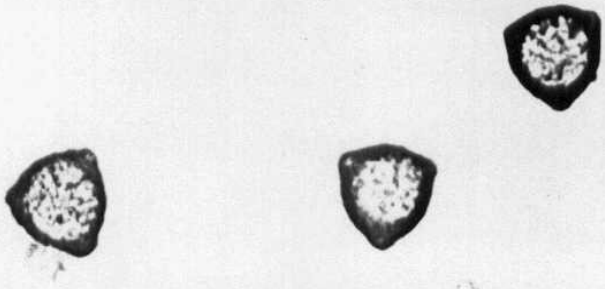


Fig. (40): Pollen grains of ***Citrus maxima.***

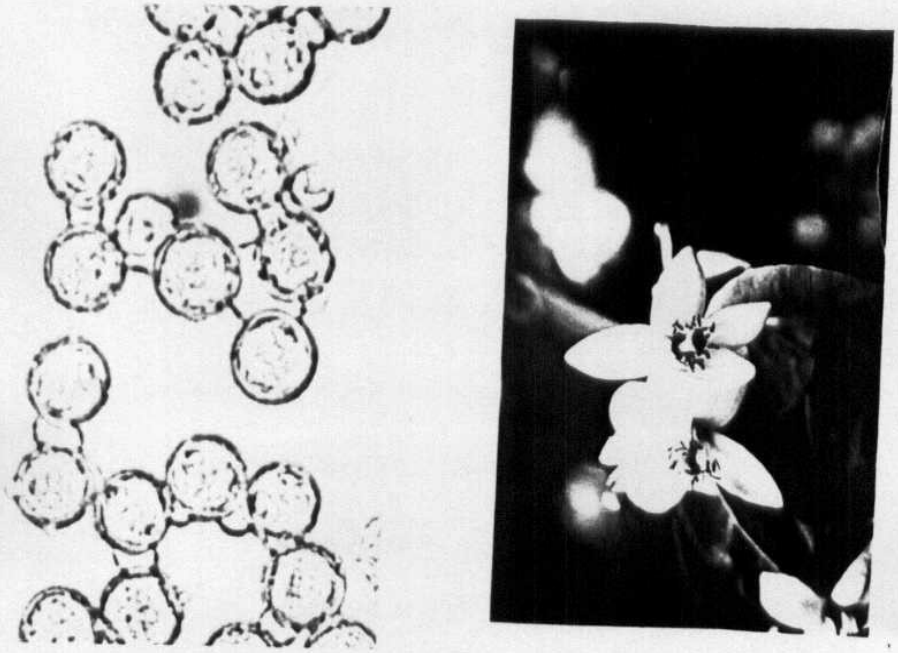


Fig. (41): Pollen grains of ***Citrus sinensis***.

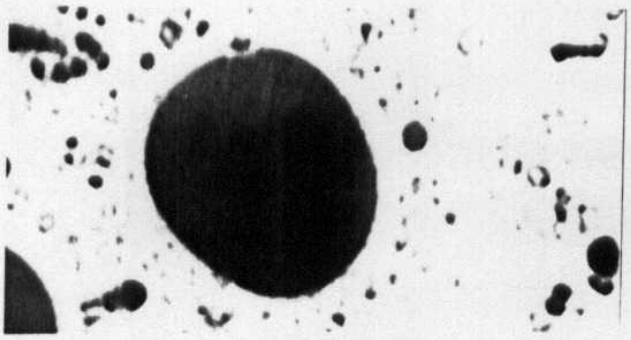


Fig. (42): Pollen grains of *Citrus aurantium*.

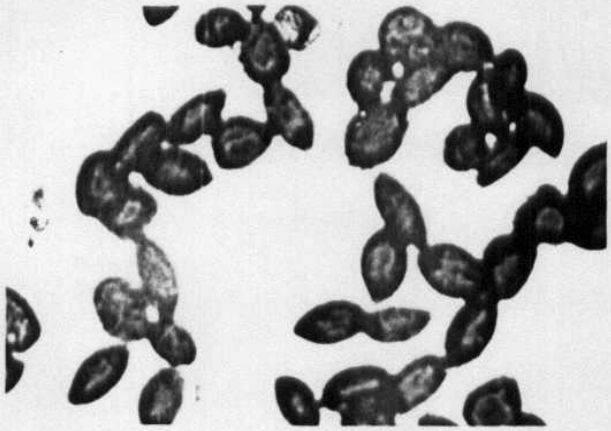


Fig. (43): Pollen grains of *Phoenix dactylifera*.

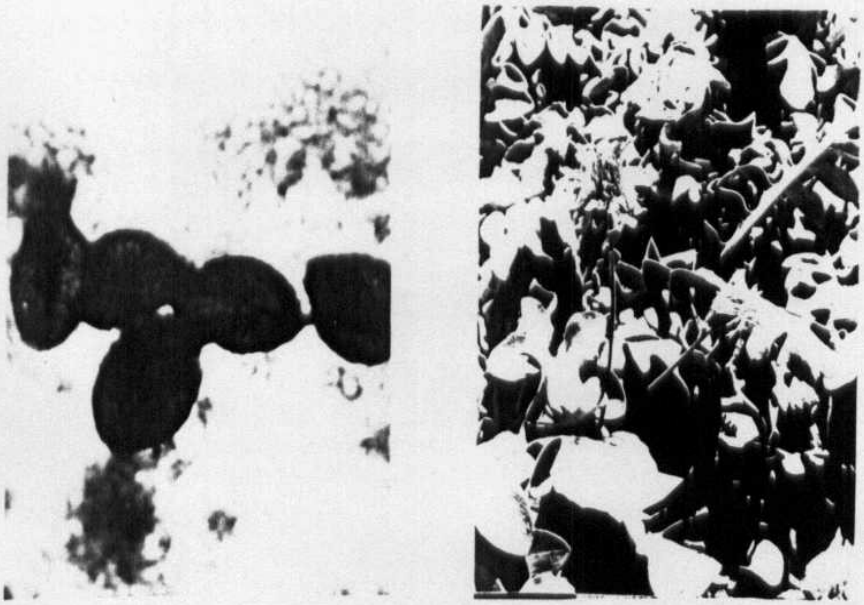


Fig. (44): Pollen grains of *Centaurea ceneraria*.

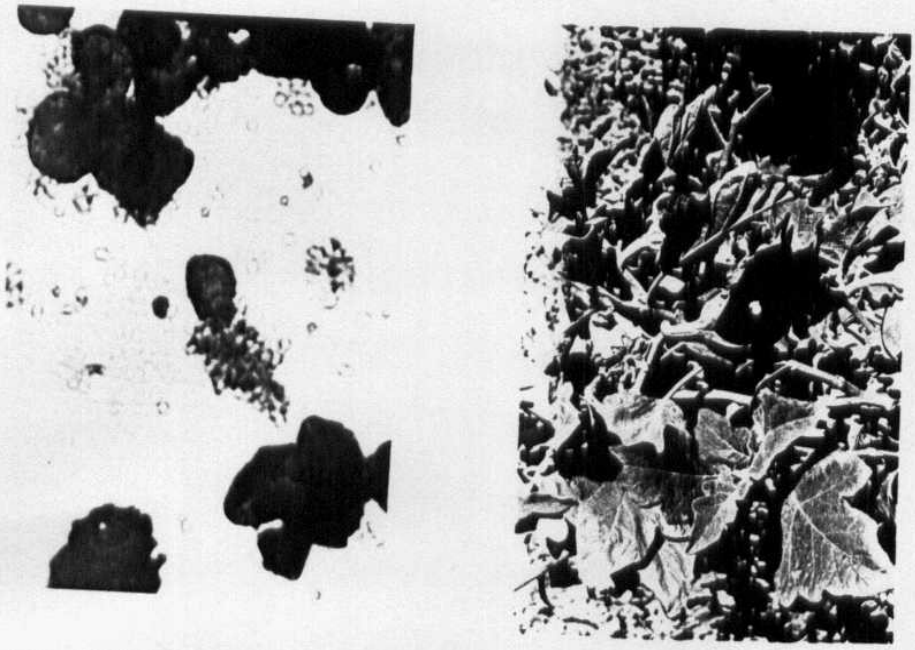


Fig. (45): Pollen grains of *Solanum melongena*.

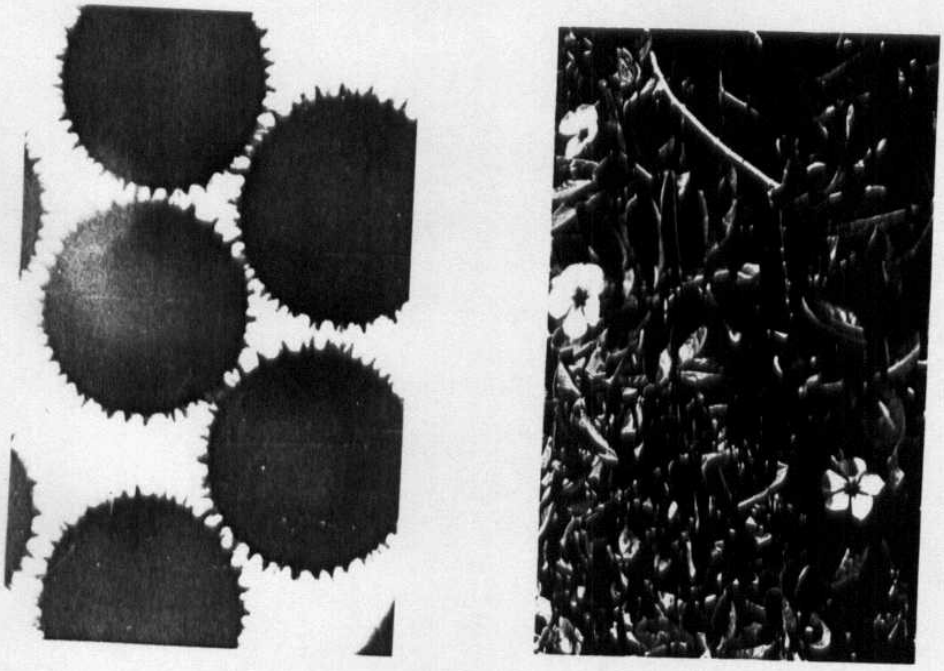


Fig. (46): Pollen grains of *Catharanthes roseus*.

Fig. (47): Pollen grains of *Jasmium grandiflorum*.

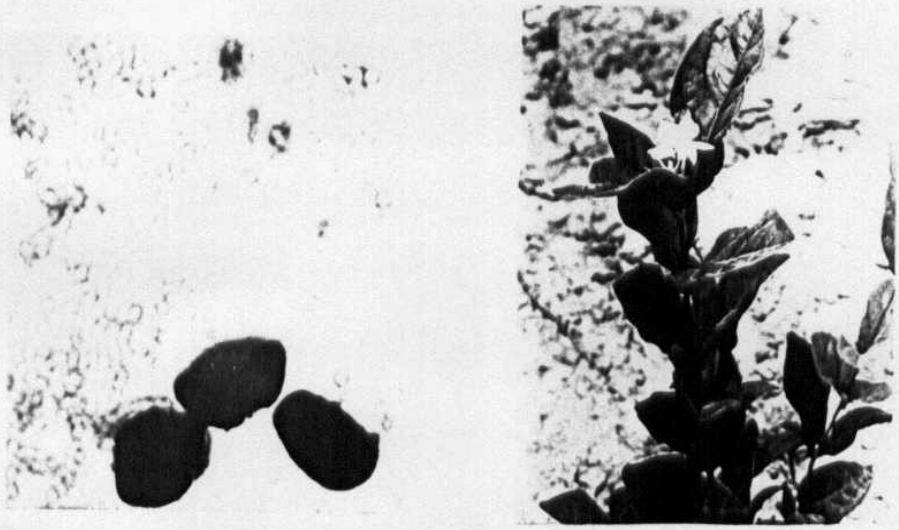


Fig. (48): Pollen grains of *Jasminum sambac*.

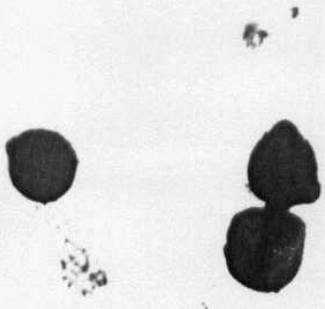


Fig. (49): Pollen grains of *Oleo europeae*.

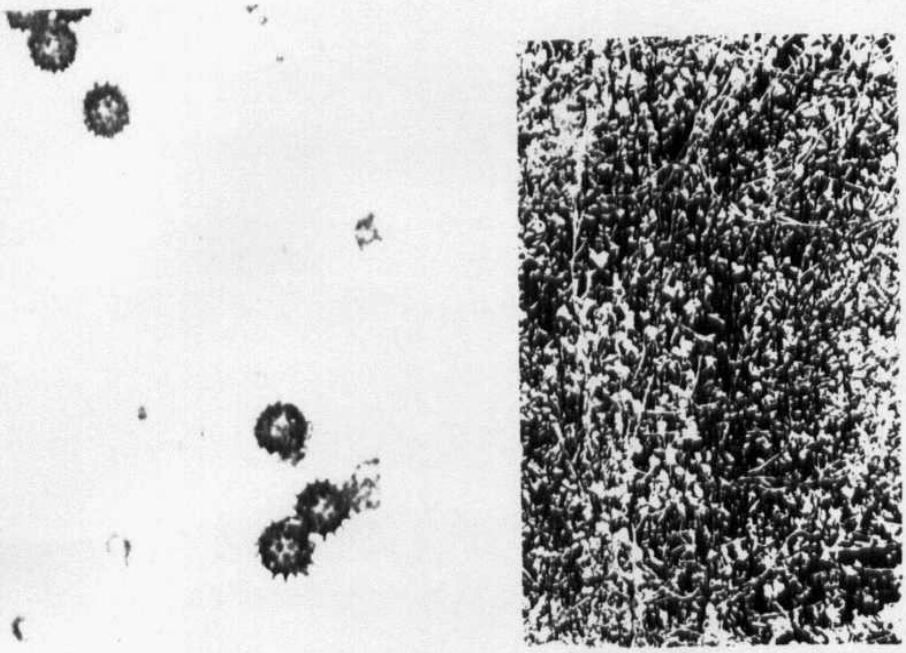


Fig. (50): Pollen grains of *Eruca sativa*.

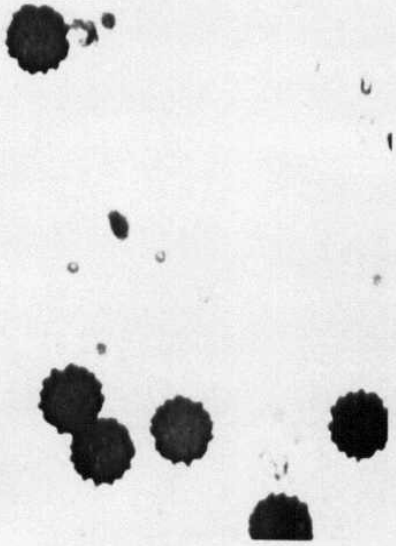


Fig. (51): Pollen grains of *Cucurbita pepo*.

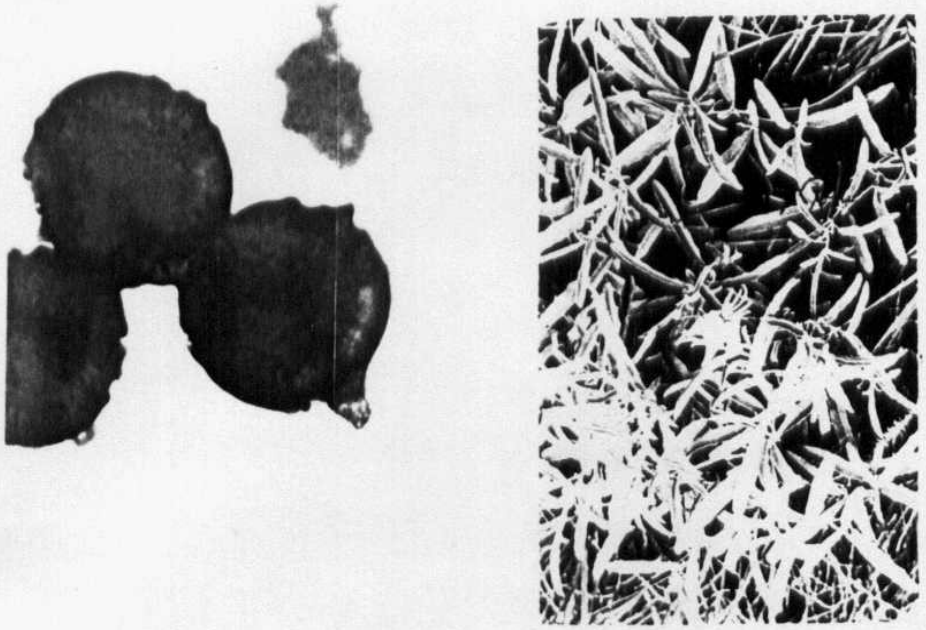


Fig. (52): Pollen grains of *Solanum eleganiaefolium*.

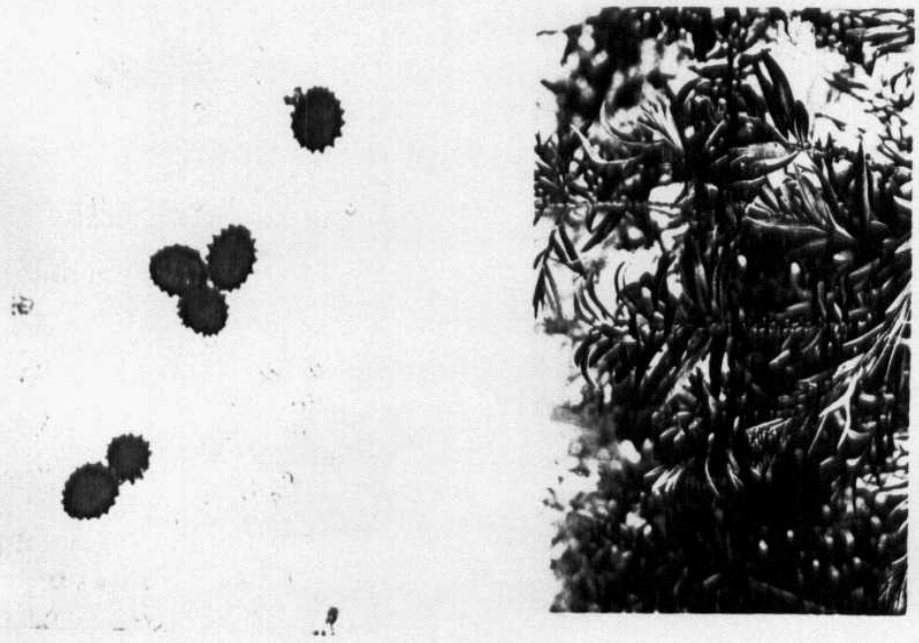


Fig. (53): Pollen grains of *Callistemon aricifolia*.

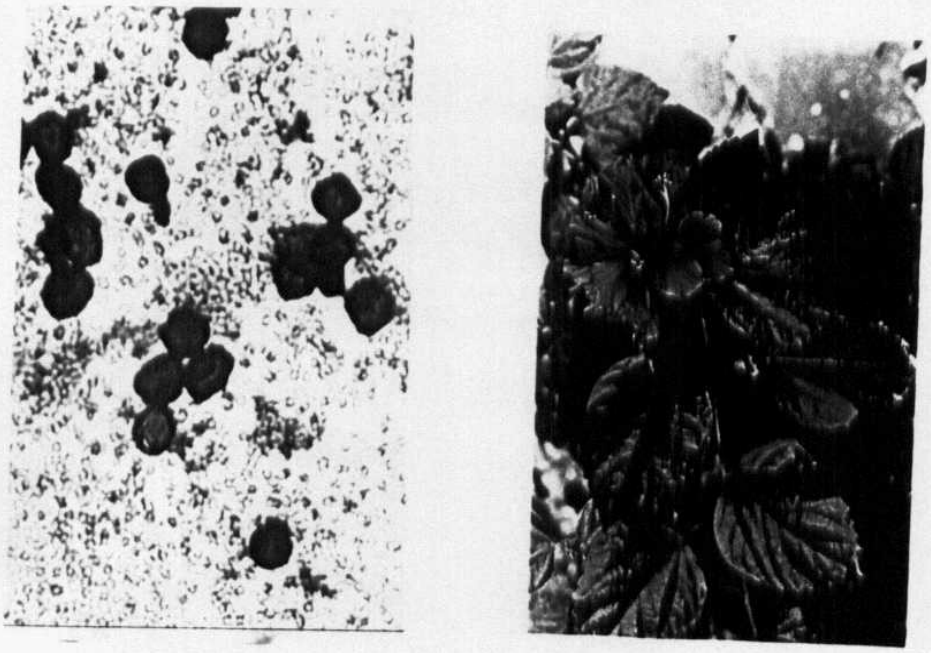


Fig. (54): Pollen grains of *Hibiscus rosa sinensis*.

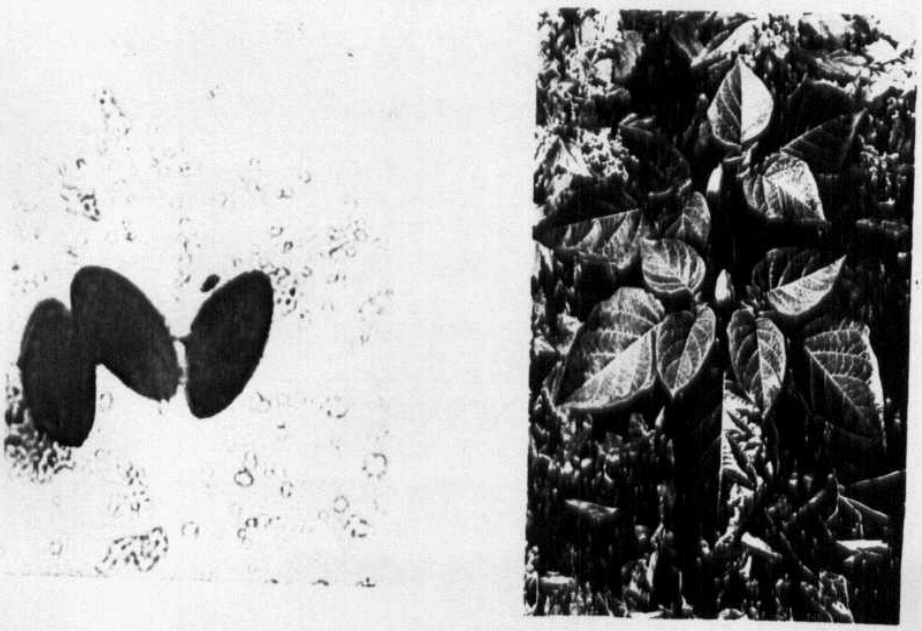


Fig. (55): Pollen grains of *Hyoscyanus muticus*.

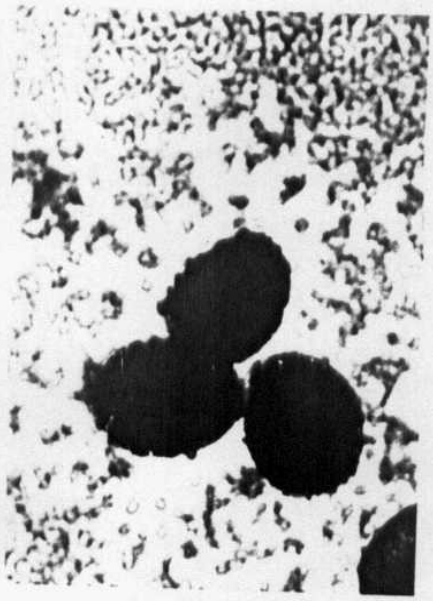


Fig. (56): Pollen grains of *Delonix pulcherrima*.

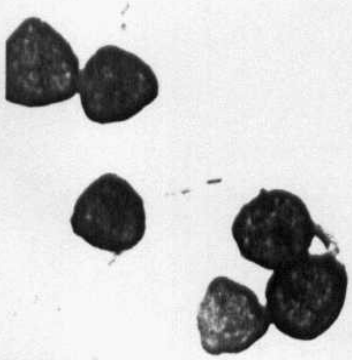


Fig. (57): Pollen grains of *Ricinus communis*.

Fig. (58): Pollen grains of *Luffa cylindrica*.

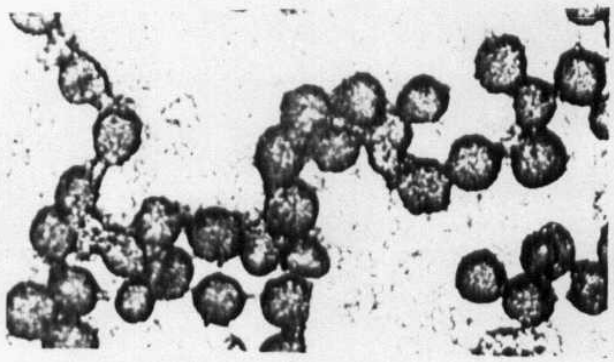


Fig. (59): Pollen grains of *Tagetes erecta*.

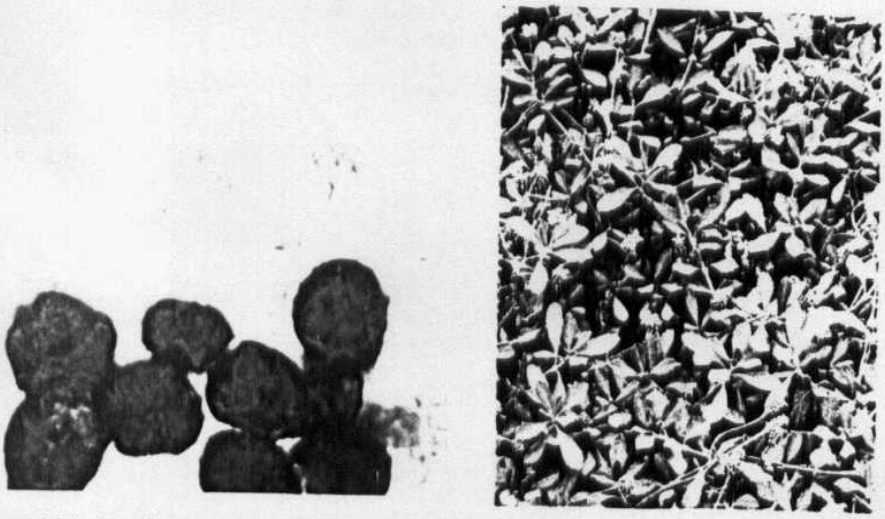


Fig. (60): Pollen grains of *Lippia nodiflora*.

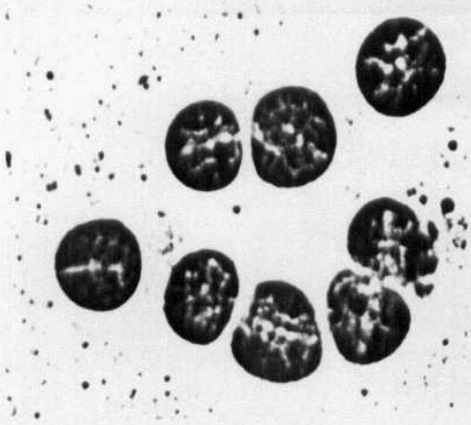


Fig. (61): Pollen grains of *Pyrus communis*.

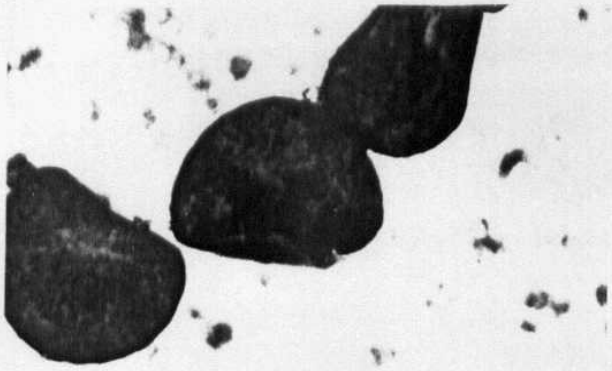


Fig. (62): Pollen grains of *Zea mays*.

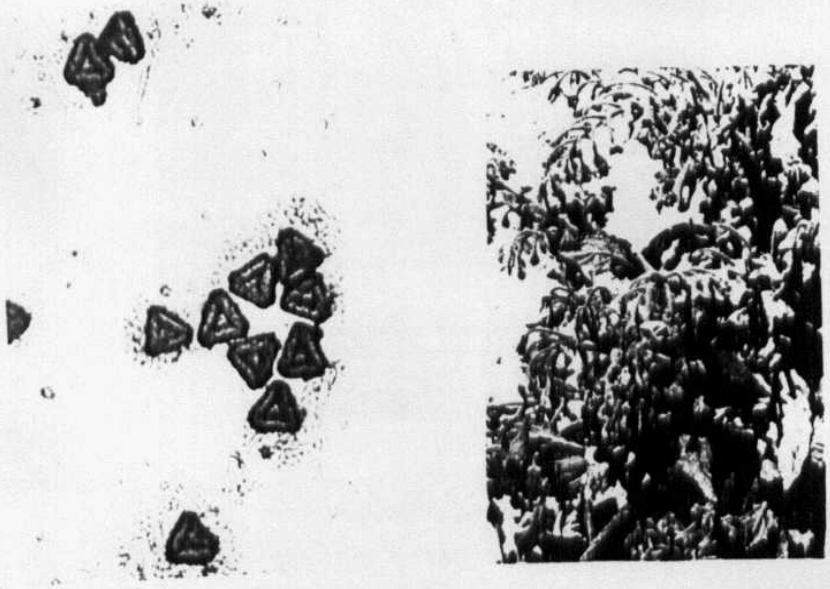


Fig. (63): Pollen grains of *Gastrocotyle hispida*.

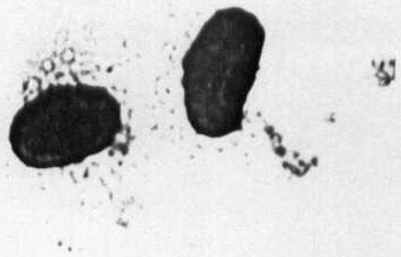


Fig. (64): Pollen grains of *Pyrus malus*.

Fig. (65): Pollen grains of *Cassia occidentais*.

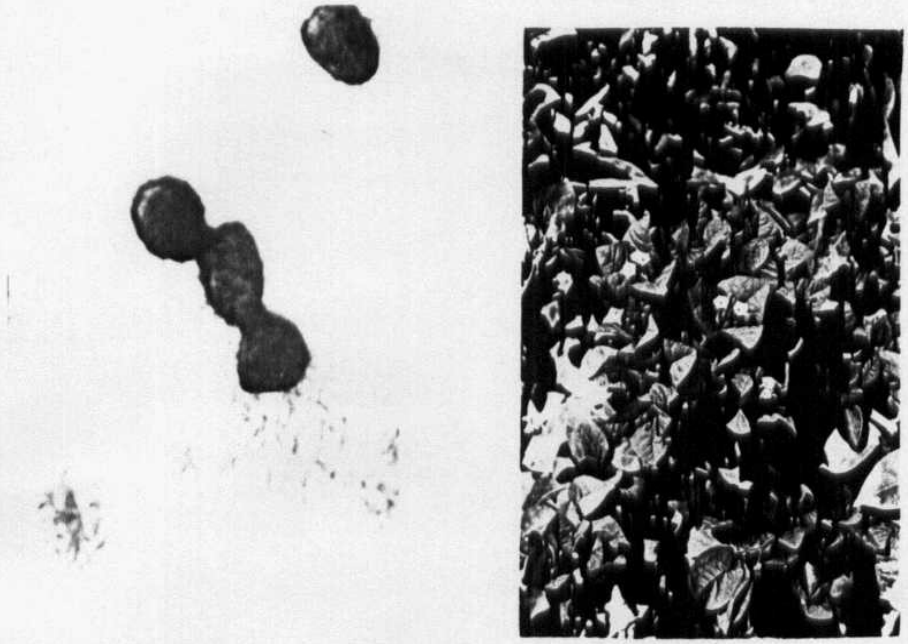


Fig. (66): Pollen grains of ***Bougainvillea glabra***.

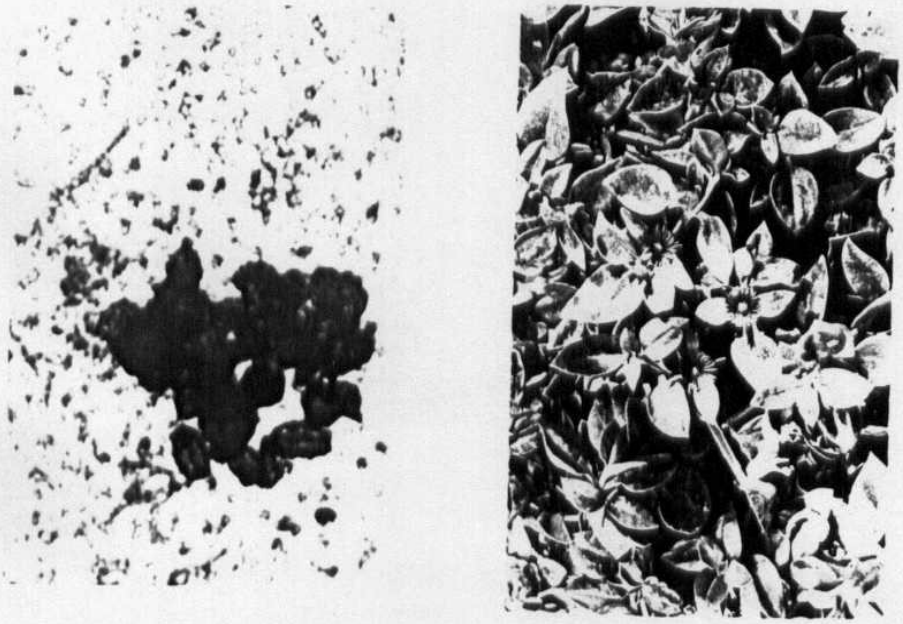


Fig. (67): Pollen grains of ***Mesenbryanthemum forskalei***.

2. Activity of honeybee in Brood rearing:

Brood-rearing activity of honeybees was study in 10 colonies during the nectar flow seasons (from July 1996 to June 1997) at El-Arish region.

Data in **Table (6)** and **Fig. (68)** indicated that the total amount of sealed brood area was 22334 in^2 with an average of 1718.25 in^2/colony/nectar flow seasons.

The mean average of sealed:-

Consequently, during the nectar flow seasons the colonies contained the highest number of workers throughout these periods, they could be reared more brood and collect a large amount of food from the available plants as well as fruiting plants and wild weeds.

The mean average areas of sealed brood in honeybee colonies recorded from July 1996 to June 1997 listed in **Table (6)**, showed that the monthly mean were 281.6, 501.7, 182.6, 139.4, 136.1, 65.6, 65.6, 145.8, 145.8, 344.7, 344.7 and 344.7 in^2.

The main activity in August 1996 with an average (501.7 in^2), followed by April (344.7), May (344.7), and June (344.7 in^2), respectively, the lowest activity were in December (65.6 in^2) and January (65.6 in^2).

The data recorded in **Table (6)** agreement with **Szabo and Lefkovitch (1991),** it was observed that the areas of sealed brood produced through the period from April to August were high, while they were low through the period from September to March. The might be due to the fluctuation of the temperature and the relative

Table (6): Honeybee activity in brood rearing in the different monthly during a year from July 1996 to June 1997 (inch^2).

Months	Amount of sealed brood-reared (inch^2)											
	1	2	3	4	5	6	7	8	9	10	Total	mean
July 96	437	179	361	241	240	241	259	284	141	433	2816	281.6
August 96	543	418	616	664	349	436	457	619	354	561	5017	501.7
September 96	239	51	2	268	144	219	125	344	269	165	1826	182.6
October 96	215	143	—	189	7	152	38	218	80	213	1255	139.4
November 96	137	146	—	161	—	126	69	195	94	161	1089	136.1
December 96	36	66	—	102	—	68	15	94	13	131	525	65.6
January 97	36	66	—	102	—	68	15	94	13	131	525	65.6
February 97	25	68	—	386	80	19	—	275	—	168	1021	145.8
March 97	25	68	—	386	80	19	—	275	—	168	1021	145.8
April 97	112	197	—	495	200	170	—	814	—	425	2413	344.7
May 97	112	197	—	495	200	170	—	814	—	425	2413	344.7
June 97	112	197	—	495	200	170	—	814	—	425	2413	344.7
Total	2029	1796	979	3984	1500	1858	978	4840	964	3406	22334	
Mean	169.1	149.6	326.3	332	166.6	154.8	139.7	403.3	137.7	283.8	1718	

L.S.D. at 5% = 90.69 in^2
1% = 120.23 in^2

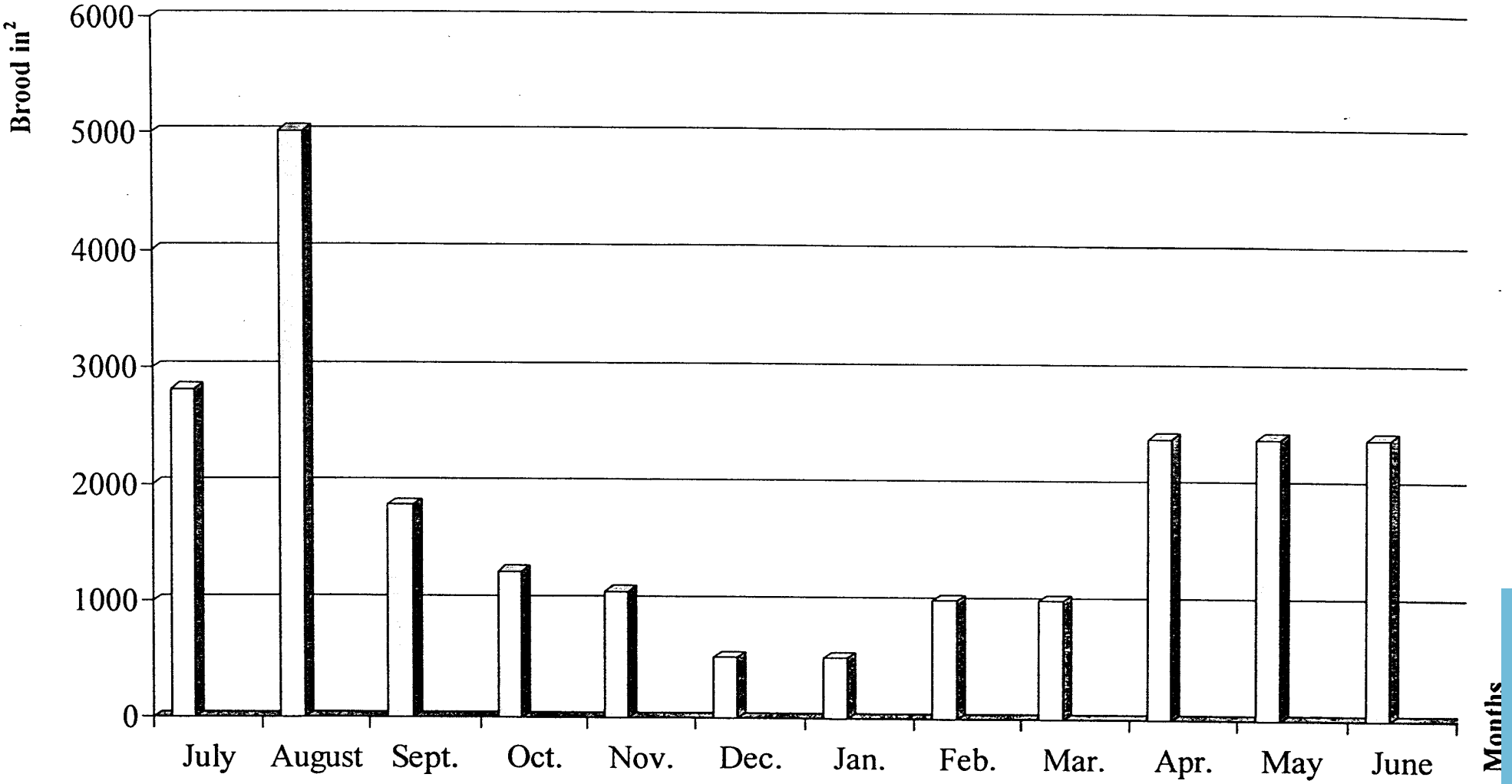


Fig (68) the amounts of brood reard in colonies during the nectar flow seasons (from July 1996 to June 1997)

humidity during the two periods were it seemed more suitable its mean was 20.31°C and 65.96RH.

As for the second period from September to March the mean of temperature and relative humidity was 17.23°C and 66.71RH. So, it gave the lowest brood areas.

For statistical analysis the data are tabulated in table (6) showed that the difference between various periods according to amount sealed brood production were highly significant during the period study ($p<0.01$), L.S.D. at 0.05 0.01 were 90.69 and 120.23 inch respectively during period studies.

3- Honeybee activity for storage pollen grains:

For estimating the activity of honeybee on pollen storage the measurement of pollen areas in combs were used in this study. The amount of pollen, which stored in square inches by 10 colonies, was conducted from July 1996 to June 1997.

Data recorded in **Table (7) and Fig. (69)** indicated that the average areas of pollen grains stored in honeybee colonies from July 1996 to June 1997 were 55.2, 74.8, 38.0, 17.2, 51.6, 19.5, 19.5, 28.4, 28.4, 143.1, 143.1 and 143.1 in^2, respectively.

The highest activity of pollen grains stored in the honeybee colonies were, in April, May, and June, 143.1 in^2, while the lowest activity were, in October, December and January, 17.2, 19.5 and 19.5 in^2, respectively.

The data tabulated in the same table different with **Mohamed and El-Shaka (1979), Rashad *et al.*, (1979) and Hussein (1981).** These different return to the different region environmental

Table (7): The areas of pollen grains stored in the hive by honeybee from July 1996 to June 1997 (in square inches).

Months	The amount of pollen stored (inch^2)											
	1	2	3	4	5	6	7	8	9	10	Total	mean
July 96	52	36	54	65	106	21	42	63	26	87	552	55.2
August 96	27	81	122	108	25	52	71	103	36	123	748	74.8
September 96	1	45	19	98	42	43	23	67	9	33	380	38
October 96	23	18	—	6	9	31	26	4	36	2	155	17.2
November 96	30	55	—	50	—	42	14	52	51	119	413	51.6
December 96	10	10	—	47	—	21	11	22	10	25	156	19.5
January 97	10	10	—	47	—	21	11	22	10	25	156	19.5
February 97	5	15	—	51	—	26	2	43	—	57	199	28.4
March 97	5	15	—	51	—	26	2	43	—	57	199	28.4
April 97	30	93	—	294	—	77	77	257	—	174	1002	143.1
May 97	30	93	—	294	—	77	77	257	—	174	1002	143.1
June 97	30	93	—	294	—	77	77	257	—	174	1002	143.1
Total	253	564	195	1405	182	514	433	1190	178	1050	5964	
Mean	21.1	47	65	117	45.5	42.8	36	99	25.4	87.5		

L.S.D. at 5% = 36.997 in^2
1% = 49.049 in^2

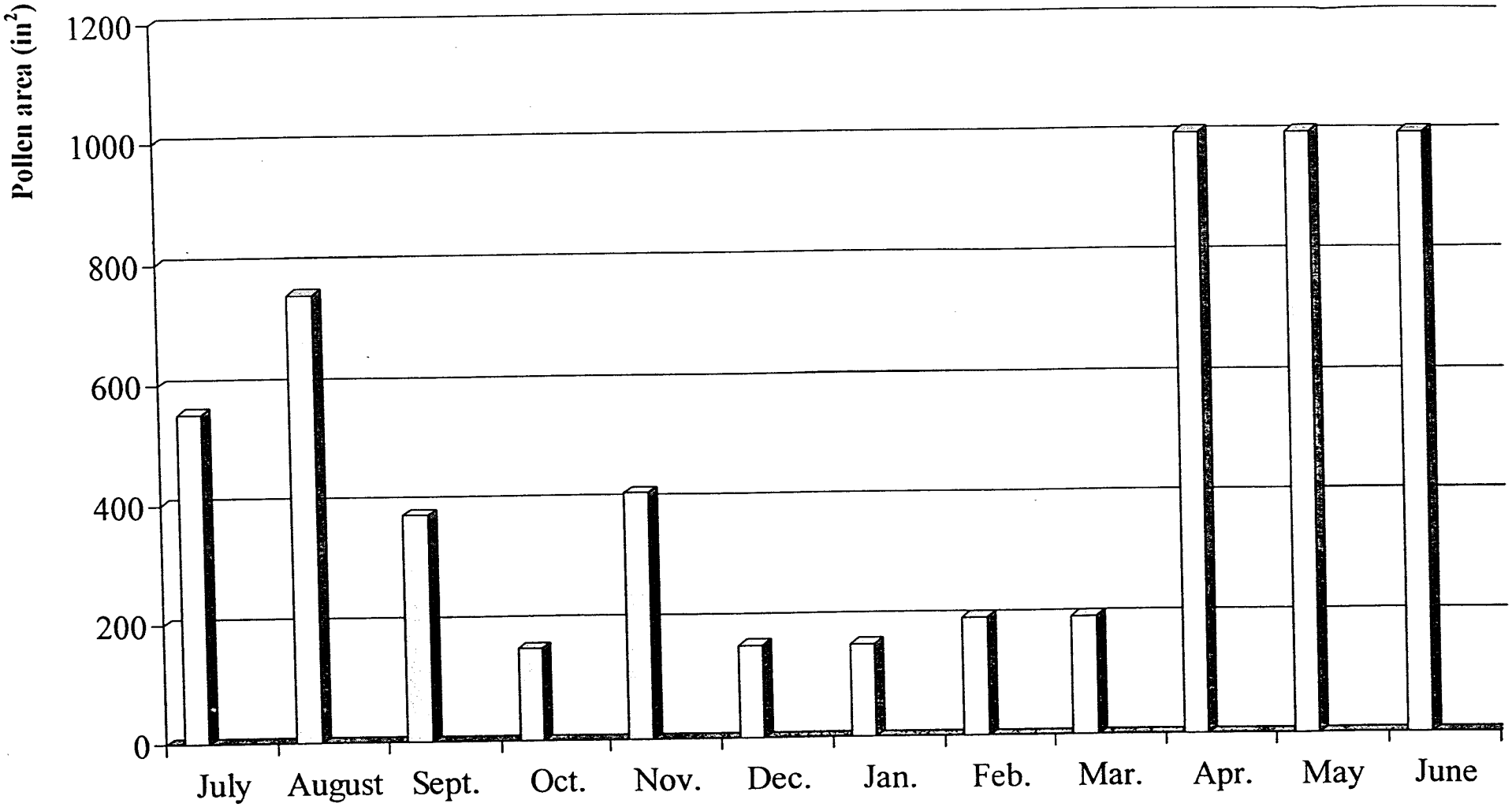


Fig (69) the amounts of stored pollens in colonies during the nectar flow seasons (from July 1996 to June 1997)

conditions and pollen source available in the region and was strong the wind during this period it is very high. The statistical analysis of the data recorded in table (3) indicated that the difference between stored of pollen grains in the hive during various periods wewe highly significant during periods of the study, L.S.D. at 0.05 and 0.01 were 36.997 and 49.049 inch respectively.

4- Honeybee activity of wax secretion:

As shown in **Table (8)** and **Fig. (70)**, average amounts wax secretion during study months difference from July 1996 to June 1997 were 7.80, 34.62, 7.01, 2.34, 0.13, 0.76, 0.76, 0.76, 3.01 and 3.01 g/colony, respectively.

The highest amount of wax was during August 34.62 g/colony, while the lowest amount of wax secretion was during November, 0.13 g/colony.

The low of product from wax per colony return to the of temperature and highest relative humidity in the region, and also this low of product wax return to littleness food supply. To secretion 1 kg of wax workerbees consume 6 to 12 kg of honey.The statistical analysis of the data recorded in table (8) showed that the difference between production of wax during various periods in the experimental was highly significant, L.S.D. at 0.05 and 0.01 were 4.74 and 6.28 gram respectively.

5- Honeybee activity of propolis collection:

Data tabulated in **Table (9)** and **Fig. (71)** showed that the average amount of propolis collected during period studies from

Table (8): The amount of wax in the honeybee colonies during nectar flow seasons (from July 1996 to June 1997).

Months	The amount of wax (g)											
	1	2	3	4	5	6	7	8	9	10	Total	Mean
July 96	3	17.005	11.005	10.005	4.009	1.006	5.002	12.008	9	6.002	78.042	7.8042
August 96	53.02	60.011	26.023	32.011	43.006	17.016	15.024	17.019	22.017	61.015	346.162	34.6162
September 96	6.01	5.018	12.002	6.014	3.014	2.0165	6.022	2.02	2.012	26.015	70.1435	7.01435
October 96	1.017	0.011	2.015	1.009	9.0075	—	2.005	1.004	0.0075	5.009	21.085	2.3427
November 96	0.008	.0035	—	0.004	—	0.008	0.007	0.017	0.007	1.001	1.055	.13193
December 96	0.0065	1.008	—	1.009	—	1.003	0.007	.0035	0.006	3.008	6.051	0.756
January 97	0.0065	1.008	—	1.009	—	1.003	0.007	.0035	0.006	3.008	6.051	0.756
February 97	0.0065	1.008	—	1.009	—	1.003	0.007	.0035	0.006	3.008	6.051	0.756
March 97	0.0065	1.008	—	1.009	—	1.003	0.007	.0035	0.006	3.008	6.051	0.756
April 97	0.0065	1.008	—	1.009	—	1.003	0.007	.0035	0.006	3.008	6.051	0.756
May 97	13	0.003	—	4.006	—	0.009	—	—	0.002	1.013	18.033	3.0055
June 97	13	0.003	—	4.006	—	0.009	—	—	0.002	1.013	18.033	3.0055
Total	89.082	87.095	51.045	62.1	59.0365	25.1335	28.095	32.085	33.077	116.108	583.57	
Mean	7.42	7.25787	12.761	5.175	14.759	2.285	2.8095	3.2086	2.76	9.676		

L.S.D. at 5% = 7.74 g
1% = 6.28 g

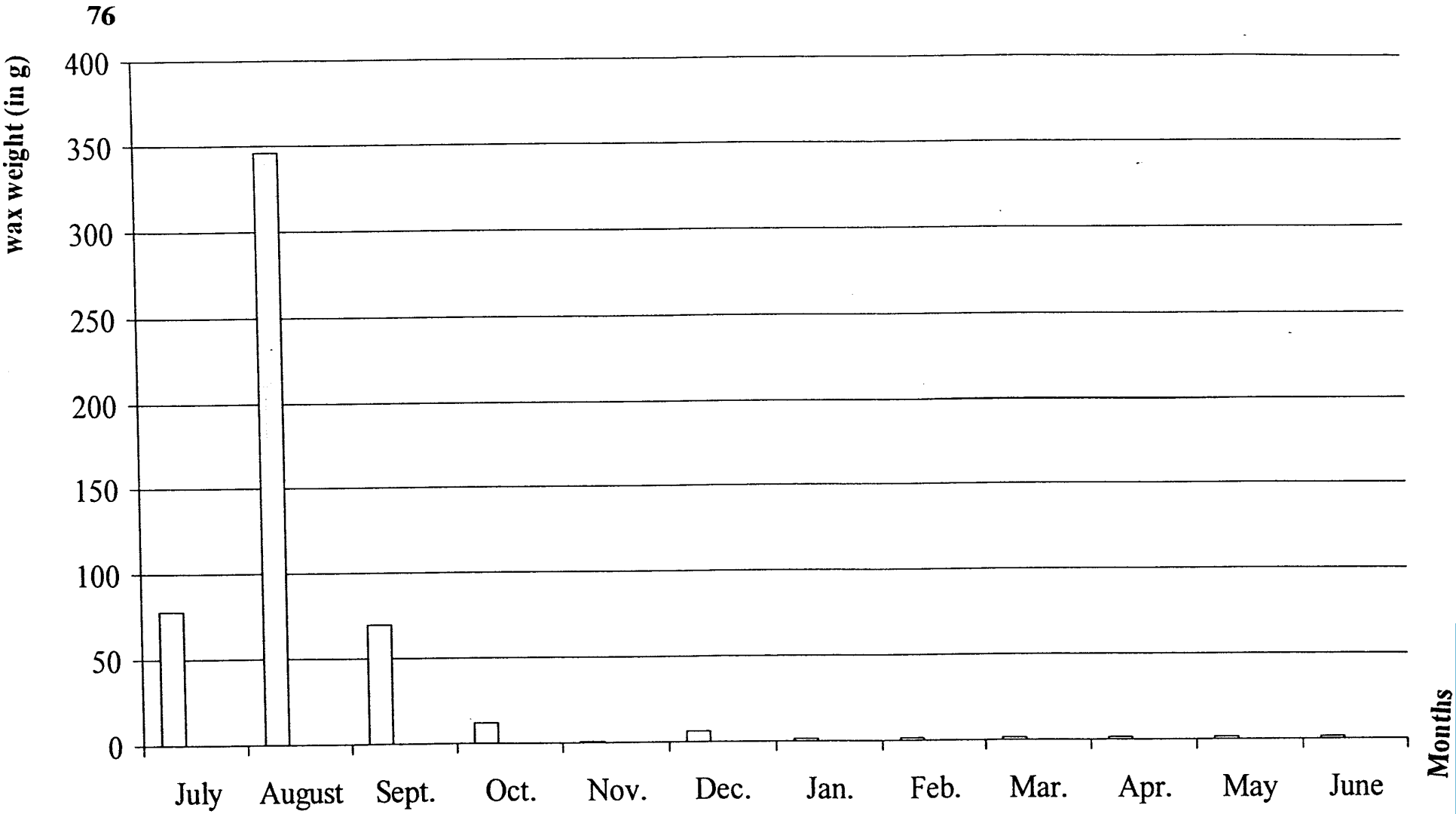


Fig (70) the amounts of wax gathering by honeybee colonies during the nectar flow seasons (from July 1996 to June 1997)

Table (9): The amount of propolis in the honeybee colonies during nectar flow seasons (from July 1996 to June 1997)

Months	Amount of propolis (g)											
	1	2	3	4	5	6	7	8	9	10	Total	Mean
July 96	3	—	1.005	2.005	1	1.006	2	3.002	—	3.007	16.025	2.003125
August 96	11.016	9.018	6.02	10.01	5.023	5.021	8.02	8.03	2.022	9.022	73.202	7.3202
September 96	2.02	0.016	0.0105	0.016	0.00095	4.017	1.0025	2.017	0.014	1.02	10.13395	1.013395
October 96	4.01	4.01	1.011	2.013	0.00125	0.006	0.00625	0.016	2.012	0.018	13.1035	1.31035
November 96	0.011	1.014	—	0.009	—	1.003	0.0035	1.006	0.002	1.007	4.0555	0.5069375
December 96	11.01	1.006	—	0.004	—	0.004	0.0045	0.00515	0.006	0.0225	12.06215	1.5077687
January 97	0.001	0.001	—	0.001	—	0.00025	0.0025	0.001	—	0.0025	0.00925	0.0010277
February 97	0.001	0.001	—	0.001	—	0.00025	0.0025	0.001	—	0.0025	0.00925	0.0010277
March 97	0.001	0.001	—	0.001	—	0.00025	0.0025	0.001	—	0.0025	0.00925	0.0010277
April 97	1.003	0.006	—	0.002	—	—	0.0015	0.0015	1.007	0.006	2.027	0.2895714
May 97	1.003	0.006	—	0.002	—	—	0.0015	0.0015	1.007	0.006	2.027	0.2895714
June 97	1.003	0.006	—	0.002	—	—	0.0015	0.0015	1.007	0.006	2.027	0.2895714
Total	34.079	15.085	8.0465	14.066	6.0252	11.05775	11.04875	14.08365	7.077	14.1395	134.70	
Mean	2.8399	1.3713	2.0116	1.1721	1.5063	1.2286	.9207	1.1736	.8846	1.1782		

L.S.D. at 5% = 1.12 g
1% = 1.48 g

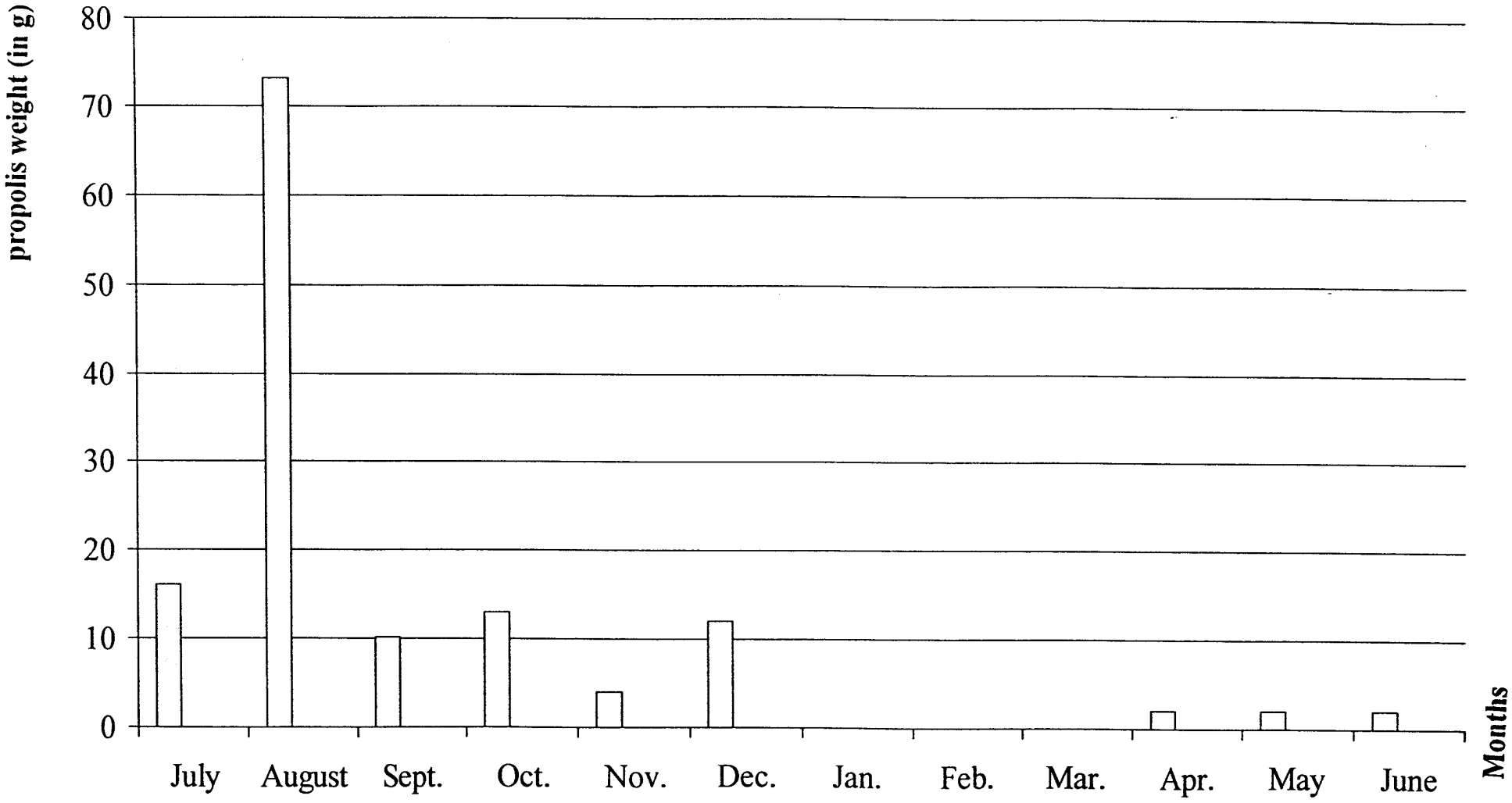


Fig (71) the amounts of propolis gathering by honeybee colonies during the nectar flow seasons (from July 1996 to June 1997)

July 1996 to June 1997 were 2.003, 7.01, 1.31, 0.51, 1.51, 0.001, 0.001, 0.001, 0.29, 0.29, and 0.29 g/colony, respectively.

The highest of propolis amount collected from colony was during August 7.32 g/colony, while the lowest amount collected was during January, February, March 0.001 g/colony.

The lowest amount of propolis collected per colony return to little found of trees and flowering plants in region and reverses environmental conditions for honeybee activity. The statistical analysis of the data recorded in table (9) indicated that the difference between production of propolis during various periods was highly significant during period of the study, L.S.D. at 0.05 and 0.01 were 1.12 and 1.48 gram respectively.

SUMMARY

This study carried out in apiary and the farm of the Faculty of Environmental Agricultural Science at El-Arish, North Sanai govenorates during July 1996 to June 1997. The main aims of this work was investigate the effect of the dominant environmental conditions in this region on the activities of the honeybee including brood rearing, pollen gathering, wax secretion and propolis collecting activities.

The obtained results could summarized:

1- Dominant environmental conditions at El-Arish region:

Previously recorded data showed that temperature degrees was moderate during July to October 1996, while showed markedly decrease during November to April 1997. Relative humidity recorded 62.6% in April 97, 70.7% during January 1997. Wind force recorded 0.96 m/sec. during May 97 arrived 12.1 m/sec in April 1997. The activities and productivity of honeybees in this region showed be markedly affected by the differences in these environmental conditions, where the productivity was low during the study period as a result to these differences. Appearance of large number of different species of flowering trees and plant was related directly with the differences in the environmental conditions.

2- Brood rearing activity:

The highest production of the brood rearing were recorded during August, 96 and April, May, June 1997. Whereas, the lowest production were recorded in December 1996 and January 1997. Moderate production was induced during other period of the study.

3- Pollen gathering activity:

During April, May, June 1997, pollen gathering activity recorded the highest productivity, while the lowest productivity was recorded during August, September, October, November, December 1996 and January, February, March 1997.

4- Wax secretion activity:

The obtained results showed that, the wax secretion activity was, generally, low. The better secretion activity was recorded during August 1996 in the region under study. While, other periods were unsuitable for the wax secretion activity. So, no or little wax production was recorded in those periods.

5- Propolis collecting activity:

The recorded results showed that the environmental conditions of the study region were unsuitable to propolis production with enough amounts. The highest amount of propolis collection was recorded during August 1996. These activities was reduced or stopped during other periods of the year.

Conclusion

1-I have recommended the beekeeper of the zone to grow the plants which shown in table Ne(2.3.4.5) becouc they are the main source of pollen grains which have mede the hive more stronger plants ere the main soruce of protien which helped brood rearing and workers to be grown

2-I recommended the beekeepers to produce the groups in the summit monthes August, July, 96 ant Apr, May, Junne,97 of production of brood rearing that bring in the economic outcometo hime beside hony

3-I recommended the beekeepers to airect bees to produce wax in order to gain elonomic profit for producing wax foundation

4-I recommended him work to gether for producing more quantities of propolis in a month August. July 96 to gain medical profit in companies of medicine

REFERNECES

Barker, K.R. (1990): Beetle induced dieback at Yeoval [Australia]: an appreciation. Australian Beekeeper, 91 (11): 479. (CAB Int. Abstracts).

Bevilacqua, M.; Bevilacqua, M.; Serra, E.; Vianello, A.; Garrou, E.; Sparagna, B.; Barale, U. and Zaccagna, C.A. (1997): Natural resin association such as incense and propolis in zootechnology. Agric. Ecosyst. Environ., 62 (2-3): 247-252. (CAB Int. Abstracts).

Bobrzecki, J. and Wilde, J. (1989): The influence of pollen trapping upon the development and productivity of weak and strong honeybee colonies. Proceedings of the XXXIst International Congress of Apiculture, Warsaw, Poland, August 19-25, 1987, pp.42l-424. (CAB Int. Abstracts).

Bobrzecki, J. and Wilde, J. (1989): Effect of pollen trapping on the development of honeybee colonies. Acta Academiae Agriculturae ac Technicae Olstenensis Zootechnica, No.32, 253-262. (CAB Int. Abstracts).

Bobrzecki, J.; Wilde, J. and Krukowski, R. (1994): Effect of fumigating honeybee colonies with Apiwarol, Warrosekt, Folbex or Fumilat on queen lifespan, spring brood rearing and honey production. Acta Academiae Agriculturae ac Technicae Olstenensis Zootechnica, No.39, 213-220. (CAB Int. Abstracts).

Boelter, A.M. and Wilson, W.T. (1984): Attempts to condition the pollen preference of honeybees. American Bee Journal, 124 (8): 609-610.

Boelter, A.M. and Wilson, W.T. (1984): Effect of methyl parathion vapors from contaminated pollen on honeybees (Hymenoptera: Apidae) within a hive. Environmental Entomology, 13 (5):1233-1236.

Brenzinger, M. (1990): Trees and grasses as rudiments of life. Use of wild plants in Kenya. Forschung, Mitteilungen der Deutschen Forschungsgemeinschaft, No.1, 10-14.

Brunsvold, R. and Villumstad, E. (1983): Effects of netting-floorboards on spring development of the honeybee colony. Birokteren, 99 (5): 126-135. (CAB Int. Abstracts).

Byrne, D.N. and Waller, O.D. (1990): Comparison of honeybee (Hymenoptera: Apidae) mortality as a result of diurnal and nocturnal applications of dimethoate. Journal of Economic Entomology, 83 (4):1267-1270.

Calatayud, F. and Verdu, M.J. (1995): Life expectancy of the mite *Varroa jacobsoni* Qud. (Mesostigmata: Varroidae) in colonies of the honeybee *Apis mellifera* L. (Hymenoptera: Apidae) during brood rearing periods. Investigacion Agraria, Produccion y Sanidad Animales, 10 (2): 153-181. (CAB Int. Abstracts).

Cassier, P. and Lensky, Y. (1995): Ultrastructure of the wax gland complex and secretion of beeswax in the worker honey bee *Apis mellifera* L. Apidologie (France), 26(1):17-26. (CAB Int. Abstracts).

Chen-Yuewen; Chen-PaoLiang; Hsu-Errtieh; Ho-Kaikuang; Chen,Y.W.; Chen, P.L.; Hsu, E.L. and Ho, K.K. (1994): The effect of coumaphos on *Varroa jacobsoni* and its influence on honeybee colony. Chinese Journal of Entomology, 14 (3): 353-360. (CAB Int. Abstracts).

Connor, L.J. (ed.); Rinderer, T. (ed.); Sylvester, H.A. (ed.) and Wongsiri, S. (1993): Asian apiculture. Proceedings of the First International Conference on the Asian honeybees and bee mites. 704 pp. (CAB Int. Abstracts).

Cox, R.L.; Moffett, J.O.; Wilson, W.T. and Ellis, M. (1989): Effects of late spring and summer menthol treatment on colony strength, and tracheal mite infestation levels. American Bee Journal, 129 (8): 547-549.

Delaplane, K.S. (1995): Early signs of wax moths in living bee colonies. American bee Journal, 135 (10): 674-675.

Dietz, A.; Krell, R. and Couvillon, G.A. (1981): The influence of intermittent pollen irapping on the development of honeybee colonies in the coastal zone of Georgia. Proceedings of the XXVIIIth International Congress of Apiculture, Acapulco, 238-241.(CAB Int. Abstracts).

Dulta, P.C.; Inma, B.S.; Verma, L.R. and Mattu, V.K. (1988): Absconding behaviour of the Indian honeybee. Indian Bee Journal, 50: 3, 67. (CAB Int. Abstracts).

Eischen, F.A.; Rothenbuhler, W.C. and Kulincevic, J.M. (1983): Brood rearing associated with a range of worker-larva ratios in the honeybee. Journal of Apicultural Research, 22 (3):163-168.

El-Nahal,A.M. (1947): Honey and pollen plants in Giza region. M.Sc. Thesis Fac. Agric. Cairo Univ.

Fathy, H.M. (1993): Effect of certain diets on brood rearing of the honeybee (*Apis mellifera* L.). Journal of Agricultural Sciences, Mansoura Univ. (Egypt), 18 (9): 2728-2733. Issued 1995.

Farra, C.L. (1934): Bees must have pollen. Gleanings in bee culture. 62 (5) 267-268.

Francis, B.R.; Blanton, W.E.; Littlefield, J.L. and Nunamaker, R.A. (1989): Hydrocarbons of the cuticle and hemolymph of the adult honeybee (Hymenoptera: Apidae). Annals of the Entomological Society of America, 82 (4): 486-494. (CAB Int. Abstracts).

Free, J.B. (1972): Insect polination of crops Acadimic. Press, London and Newyork. 544pp.

Giacon, H. and Malone, L. (1995): Testing imported bee products for European foul brood. New Zealand Beekeeper, 2 (8): 8-9. (CAB Int. Abstracts).

Glinski, Z. and Kauko, L. (1995): Anti-infectious protective mechanisms of the honeybee colony. Suomen Elainlaakarilehti,101 (7-8): 453-456. (CAB Int. Abstracts).

Graaf, J. de (1983) : On the composition and size of the honeybee colony. Maandschrift voor Bijenteelt, 85 (4): 107; 137-140. (CAB Int. Abstracts).

Hagler, J.R. and Cohen, A.C. (1990): Effects of time and temperature on digestion of purified antigen by Geocoris punctipes (Hemiptera: Lygaeidae) reared on artificial diet. Annals of the Entomological Society of America, 83 (6): 117-1180. (CAB Int. Abstracts).

Hambelton, J.J.(1925): The effect of weathe upon the change in weight of colony of bees during the honey flow U.S.D.A. Bull,1339.

Handal, C.S. (1983): Determination of the quantities of brood in honeybee colonies during one year, at two different altitudes in El Salvador. Vida Apicola, No.7, 13-15. (CAB Int. Abstracts).

Harbo, J.R. (1989): Effects of population size on brood production, worker survival and honey gain in colonies of honeybees.

Journal of Apicultral Research, 25 (1): 22-29. (CAB Int. Abstracts).

Harbo, J.R. (1994): Field test of bees that had been treated with heat. American Bee Journal, 134 (12): 833-834.

Harbo, J.R. and Hoopingamer, R. (1995): Resistance to Varroa expressed by honeybees in the USA. American Bee Journal, 135 (12): 827.

Herbert, E.W. Jr. and Shimanuki, H. (1984): Effect of pH of pollen and worker jelly on the incidence of European foulbrood in honeybee colonies in New Jersey. American Bee Journal, 124 (2): 135-136

Hodegs,D.(1952): The pollen loads of the honey bee. Bee Research Association, London.

Hyde, H.A. and Adams,K.F. (1958): An atlas of airborne pollen grains. Macmillan and Co. LTD, London.

Hussein, M.H. (1981): Pollen-gathering activity of honeybee workers in Assiut Governorate. Proceedings, 4th Arab Pesticide Conference. pp. 377-385.

Iannuzzi, J. (1983): Propolis: The most mysterious hive element. Part II - Conclusion. American Bee Journal, 123 (9): 631-633.

Jedruszuk, A. (1990): Changes in the nest of a honeybee colony during fumigation against varroa disease. Pszczelnicze Zeszyty Naukowe, 34: 115-122. (CAB Int. Abstracts).

Johnson, K.S.; Eischen, F.A. and Giannasi, D.E. (1994): Chemical composition of North American bee propolis and biological activity towards larvae of greater wax moth (Lepidoptera: Pyralidae). J. Chem. Ecol. 20 (7): 1783-1792. (CAB Int. Abstracts).

Jyothi, J.V.A. and Reddy, C.C. (1996): The effect of phoretic mite, *Neocypholaelaps indica* on pollen gathering activity of honeybee, *Apis cerana indica*. Geobios Jodhpur, 23 (1): 74-76. (CAB Int. Abstracts).

Jyothi, J.V.A.; Reddy, C.C.; Veeresh, G.K. (ed.); Shaanker, R.U. (ed.); and Ganeshaiah, K.N. (Editors) (1993): The effect of phoretic mite *Neocypholaelaps indica* on pollen gathering activity of honeybee *Apis cerana indica*. Pollination in tropics: Proceedings of the International Symposium on pollination in tropics, August 8-13,1993, Bangalore, India. (CAB Int. Abstracts).

Khan, B.M. and Chaudhry, M.I. (1988): Comparative assessment of honeybees and other insects with self-pollination of sarson in Peshawar. Pakistan Journal of Forestry, 38 (4): 231-237. (CAB Int. Abstracts).

Khattab, M.M.(1976): Effect of ecological factors on honey bee activities. M.Sc. Apiculture, Fac. Agric. Cairo Univ.

Kpch,B.(1967): Results of scale-hive observations in Pfalz-Rheinhessen, Imkerzty, 1,(9) :296-303.

Koo, M. Hyun and Park, Yong Kun (1997): Investigation of flavonoid aglycones in propolis collected by two different varieties of bees in' the same region. Biosci. Biotechnol. Biochem., 61 (2): 367-369. (CAB Int. Abstracts).

Kumar, R.; Pal, D.; Kumar, N.R. and Bhalla, O.P. (1994): Effect of mite (*Tropilaelaps clareae* Delfinado and Baker) infestation on the species composition of microorganisms in *Apis mellifera* L. Indian Bee J., 56 (1-2): 68-71. (CAB Int. Abstracts).

Lehner, Y. (1983): Nutritional considerations in choosing protein and carbohydrate sources for use in pollen substitutes for honeybees. Journal of Apicultural Research, 22 (4):242-248. (CAB Int. Abstracts).

Liakos, B. (1989): Harmful effects on honeybee brood from wax contaminated by pesticides. Deltion tes Ellenikes Kteniatrikes Etaireias. Bulletin of the Hellenic Veterinary Medical Society, 1989, 40: 2, 84-88. (CAB Int. Abstracts).

Liebig, G. (1996): The natural mite fall [in hive debris] - not suitable for rearing work. Bienenpflege, No.2, 63-66. (CAB Int. Abstracts).

Mahran, L.G.; El-Khatib, A.S.; Agha, A.M. and Khayyal, M.T. (1996): The protective effect of aqueous propolis extract on

isolated rat hepatocytes against carbon tetrachloride toxicity. Drugs Exp. Clin. Res., 22 (6): 309-316. (CAB Int. Abstracts).

Marcinkowski, J. (1987): Usability of some types of hive for bee management in the Pulawy area [Poland]. Pszczelnicze Zeszyty Naukowe, 31: 340. (CAB Int. Abstracts).

Maskey, M. (1989): Inter-relationship between bees and flowers in Kathmandu Valley. Proceedings of the Fourth International Conference on Apiculture in Tropical Climates, Cairo, Egypt, 6-10 November 1988, pp. 116-126.

Menezes, H.; Bacci, M., Jr.; Oliveira, S.D. and Pagnocca, F.C. (1997): Antibacterial properties of propolis and products containing propolis from Brazil. Apidologie, 28 (2): 71-76. (CAB Int. Abstracts).

Meyer, J. (1990): Removing bees from buildings. American Bee Journal, 130: 396-399; 467-469; 545-547; 582-584

Milum,V.G.(1961): Colony weight changes one and tweenty years.Amer. Bee J. 101,(3) 93-94.

Moffet,J.O.(1953): Relation of weather factors to nectar flow in honey production.Tech.Bull. Kansas Agric.Exp.Sta. 74:1-27.

Muzaffar, N.; Ahmad, R. and Rhodes, J.W. (ed.) (1988): Studies on low cost honeybee hives in Pakistan. Bee keeping in the year 2000. Proceedings of the Second Australian and

International Beekeeping Congress, Surfers Paradise, Gold Coast, Queensland, Australia, July 21-26, 1988, pp. 229-231. (CAB Int. Abstracts).

Nakajima, C.; Okayama, A.; Sakogawa, T.; Nakamura, A. and Hayama, T. (1997): Disposition of ampicillin in honeybees and hives. Journal of Veterinary Medical Science, 59 (9): 765-767.

Nelson, D.L. (1982): The effect of queen-related problems on honey production. American Bee Journal, 122 (9): 636-637.

Nelson, D.L. (1995): Control of the honeybee tracheal mite with menthol and formic acid. Canadian Beekeeping, 18 (5): 136-137. (CAB Int. Abstracts).

Nelson, D.L. and Gary, N.E. (1983): Honey productivity of honeybee colonies in relation to body weight, attractiveness and fecundity of the queen. Journal of Apicultural Research, 22 (4): 209-213. (CAB Int. Abstracts).

Nitsch, C.; Horn, H. and Vorwohl, G. (1994): Effect of Dimilin on queen rearing. Deutsche Bienen Journal, 2 (12): 16-19. (CAB Int. Abstracts).

Okada, I.; Ono, M.; Kurihara, T. and Nakamura, C. (1984): Observations on winter kill of Japanese and European honeybees. Honeybee Science, 5 (4): 159-166. (CAB Int. Abstracts).

Orosi-Pal, A.(1956): Amergezo meztitka nyomaban. (on the track of the poisonous honey).Meheszet, 4, 25-27.

Percival,M.S. (1955): Thepresentantion of pollen in certain anbiosperms and its collection by Apis mellifera. New Phytol.54, 353-368.

Pidek, A. (1988): Efficiency of increased production of wax in a honey bee colony. Pszczelnicze Zeszyty Naukowe, 32:181-195. (CAB Int. Abstracts).

Pidek, A. (1989): Effects of restricting the queen's egg laying before the main honey flow, and subsequent nest reconstriction. Pszczelnicze Zesyty Naukowe, 33:121-131. (CAB Int. Abstracts).

Pirch,G.B. (1923): Studies on the temperature of individual inaects with special references to the honey. J. Agric. Res. 24, 275-288.

Popeskovic, D.; Milosavljevic, V. and Jovanovic, Z. (1981): Tolerance of honeybees to asphyxia in the presence of propolis. Naturwissenschaften. 68 (5): 266-267. (CAB Int. Abstracts).

Puerta, F.; Cano, D.; Flores, J.M.; Pellin, P.; Padilla, F. and Bustos, M. (1989): Food reserves and the initiation of egg laying in *Apis mellifera* iberica. Archivos de Zootecnia, 38: 141-149. (CAB Int. Abstracts).

Rashad,S.E.(1957): Some factors affecting pollen collection by honey bees and pollen as limiting factor in brood rearing and honey production. Kansas State College. PH.D. thesis U.S.A.

Rashad,K. and Parker,R.L.(1958a): Pollen as a limiting factor in brood rearing and honey production during three drought years ,1954.1955and 1956. Trans,Kansas Acad.Sci.16(3)237-248.

Rivera, R. and Wilson, W.T. (1989): Presence and removal of menthol in honey and beeswax. American Bee Journal, 129 (12): 821.

Rizk, G.A. and Attallah, M.A. (1978): Pollen gathering activity of honeybee colonies in relation to certain weather factors in middle Egypt. Bulletin de la Societe Entomologique d'Egypt, 62: 57-61.

Schmidt, J. (1994): Does a shortening of the post-capping period influence the development of Varroa and bee populations respectively. Apidologie, 25 (5): 497-498. (CAB Int. Abstracts).

Seeley, T.D. and Visscher, P.K. (1985): Survival of honeybees in cold climates: the critical timing of colony growth and reproduction. Ecological Entomology, 10 (1): 81-88.

Sihag, R.C. (1982): Problem of wax moth (*Galleria mellonella* L.) infestation on giant honey bee (*Apis dorsata* Fab.) colonies

in Haryana. Indian Bee Journal, 44 (4): 107-109. (CAB Int. Abstracts).

Snodgrass,R.E. (1925): Anatomy and Physiology of the honey bee.

Sokol, R. (1996): Effects of long-term persistence of Fluwarol [fluvalinate] on honeybee colonies. Medycyna Weterynaryjna, 52 (11): 718-720. (CAB Int. Abstracts).

Starostenko, E.V. (1982): Floral specialization and proboscis length. Pchelovodstvo, No.12, 19-20. (CAB Int. Abstracts).

Stoner, A.; Wilson, W.T. and Harvey, J. (1984): Honeybee exposure to beeswax foundation seeded with methyl parathion Southwestern Entomologist, 9 (1): 22-27. (CAB Int. Abstracts).

Stoner, A.; Wilson, W.T. and Harvey, J. (1985): Honeybee exposure to beeswax foundation impregnated with fenvalerate or carbaryl. American Bee Journal, 125 (7): 513-516.

Sver, L.; Orsolic, N.; Tadic, Z.; Njari, B.; Valpotic, I. and Basic, I. (1996): A royal jelly as a new potential immunomodulator in rats and mice. Comparative Imuunology, Microbiology and Infectious Diseases, 19 (1): 31-38. (CAB Int. Abstracts).

Syng,A.D. (1947): Pollen collection by honey bees. J. Anim. Ecol. 16 : 122- 138.

Szabo, T.I. (1995): The production of drone comb and drone brood in honeybee colonies. American Bee Journal (USA), 135(9): 642-643.

Szabo, T.I. and Lefkovitch, L.P. (1989): Effect of brood production and population size on honey production of honeybee colonies in Alberta, Canada. Apidologie, 20 (2): 157-163. (CAB Int. Abstracts).

Szabo, T.I. and Lelkovitch, L.P. (1991): Development of overwintered honeybee Colonies with one- and two-year-old queens. Bee Science, 1 (3): 144-150. (CAB Int. Abstracts).

Taranov, G.F.(1959): The production of wax in the honey bee colony. Bee World 40: 113- 121.

Tew, J.E. and Caron, D.M. (1988): Measurements of cucumber and soybean pollination efficiency by honeybees hived in a prototypic pollination unit. Research Circular Ohio State University, Ohio Agricultural Research and Development Center, No.295, 38-41. (CAB Int. Abstracts).

Verma, L.R.; Rana, B.S. and Mattu, V.K. (1988): Economic and biological characters of the Indian honey bee, *Apis cerana* Fabr.: effect of seasonal variations. Indian Bee Journal, 50 (2): 33-35. (CAB Int. Abstracts).

Villa, J.D.; Koeniger, N. and Rinderer, T.E. (1991): Overwintering of Africanized, European, and hybrid honey

bees in Germany. Environmental Entomology, 20 (1): 39-43. (CAB Int. Abstracts).

Wael, L.de; Greef, M. de; De-Wael, L. and De-Greef, M. (1990): Influence of the honeybee on the transmission of fire blight. Mededelingen van de Faculteit Landbouwwetenschappen, Rijksuniversiteit Gent, 55 (3a): 1107-1111. (CAB Int. Abstracts).

Wafa,A.K.and Ibrahim,S.H.(1959): Temperature as a factor affecting nectar gathering activity in Egypt. Bull. Fac. Agric. Cairo Univ.

Waller, O.D. (1983): Basic bee biology affects pollination. Speedy Bee, 12 (8): 15-18. (CAB Int. Abstracts).

Webster, T.C. (1994): Fumagillin affects *Nosema apis* and honeybees (Hymenoptera: Apidae). J. Econ. Entomology, 87 (3): 601-804.

Webster, T.C. and Peng, Y.S. (1989): Short-term and long-term effects of metharnidophos on brood rearing in honeybee (Hyinenoptera: Apidae) colonies. Journal of Economic Entomology, 82 (1): 69-74.

Wieting, J. and Ferenz, H.J. (1991): Behavioral study on the invasion of honeybee brood by the mite *Varroa jacobsoni* on wax combs and ANP combs. American Bee Journal, 131 (2): 117-118.

Wilde, J. (1996): Effect of fumagillin treatment during winter on the development and productivity of honeybee colonies. Annales Universitatis Mariae Curie Sklodowska Sectio, DD, Medicina Veterinaria, 51 (19): 155-161. (CAB Int. Abstracts).

Wille, H. (1985): Survival strategies of honeybee colonies. Bienenwelt, 27 (7):169-182. (CAB Int. Abstracts).

Wilson, W.T.; Ibarra, J.; Rivera, R.; Maki, D.L. and Baxter, J. (1997): Honeybee colony development following exposure to Suredye bait in Guatemala. American Bee Journal, 137 (3): 228-229.

Woyke, J. (1981): Investigation of internal factors in honeybee colonies which affect honey production in El Salvador. Proceedings of the XXVIIIth International Congress of Apiculture, Acapulco, pp. 298-304. (CAB Int. Abstracts).

Woyke, J. (1984): Correlations and interactions between population, length of worker life and honey production by honeybees in a temperate region. Journal of Apicultural Research, 23 (3): 148-156.

Woyke, J. (1984): Exploitation of comb cells for brood rearing in honeybee colonies with larvae of different survival rates. Apidologie, 15 (2): 123-136. (CAB Int. Abstracts).

Young, B.A.; Francis, J.A.; Gregory, P. and Nicholson-Scheer, K. (1988): Fall honey reserves and winter survival of honeybee colonies. Agriculture and Forestry Bulletin, Special issue, 6364.

ARABIC SUMMARY

الملخص العربي

أجريت هذه الدراسة بمنحل كلية العلوم البيئية الزراعية بالعريش محافظة شمال سيناء خلال الفترة من يوليو ٩٦ حتى يونيو ٩٧ بهدف معرفة تأثير الظروف البيئية السائدة بالمنطقة على نشاط نحل العسل في إنتاج الحضنة وجمع حبوب اللقاح وافراز الشمع وجمع البروبليس (صمغ النحل) ، كما تمت عملية حصر للنباتات المزهرة والمنتجة للرحيق في ذات المنطقة .

وكانت النتائج على النحو الآتي :

١- الظروف البيئية السائدة في منطقة العريش :

دلت البيانات المسجلة على اعتدال درجة الحرارة في الفترة من يوليو حتى أكتوبر ٩٦ بينما كانت درجة الحرارة منخفضة خلال الفترة من نوفمبر ٩٦ حتى ابريل ٩٧ ، وتراوحت الرطوبة النسبية بين ٦٢,٦% في شهر ابريل ٩٧ ، ٧٠,٧% خلال شهر يناير ٩٧ ، وكانت شدة الرياح بين ٠,٩٦ متر/ثانية خلال شهر مايو ٩٧ إلى ١٢,١ متر/ثانية خلال شهر أبريل ٩٧ ، وكان لتباين درجة الحرارة والرطوبة النسبية وشدة الرياح في منطقة الدراسة تأثير مباشر على إنخفاض الإنتاجية المتوقعة من طوائف نحل العسل وكان كذلك لتباين الظروف البيئية في منطقة الدراسة ظهور عدد كبير من النباتات والأشجار المزهرة تندرج تحت عدد من العائلات النباتية بلغ ٢٦ عائلة نباتية مختلفة على مدار فترة الدراسة.

٢- نشاط نحل العسل في تربية الحضنة :

دلت النتائج المتحصل عليها على أن أحسن فترة في إنتاج الحضنة كانت خلال أشهر أغسطس ٩٦ ، ابريل ، مايو ، يونيو ٩٧ ، بينما كانت أقل فترة في إنتاج الحضنة خلال أشهر ديسمبر ٩٦ ، يناير ٩٧ ، أما بقية الفترة من الدراسة تراوح إنتاج الحضنة بين هاتين الفترتين.

٣- نشاط نحل العسل في تحزين حبوب اللقاح :

أظهرت النتائج أن أعلى فترة في إنتاج حبوب اللقاح كانت خلال أشهر أبريل ومايو ويونيو ٩٧ ، بينما كانت أقل فترة لإنتاج حبوب اللقاح خلال أشهر أغسطس وسبتمبر وأكتوبر ونوفمبر وديسمبر ٩٦ ، ويناير وفبراير ومارس ٩٧.

٤- نشاط نحل العسل في إفراز الشمع :

أظهرت النتائج المتحصل عليها على أن إنتاج الشمع في منطقة العريش كان منخفض بصفة عامة ، إلا أنه كان شهر أغسطس ٩٦ أنسب فترة مناسبة لإنتاج الشمع بمنطقة الدراسة ، بينما بقية فترات السنة من الدراسة كانت غير ملائمة لإنتاج الشمع حيث كانت الكميات المنتجة قليلة جداً وغير معنوية على مدار فترة الدراسة.

٥- نشاط النحل في جمع البروبليس :

دلت النتائج المتحصل عليها أن الظروف البيئية لمنطقة الدراسة بالعريش كانت غير ملائمة لإنتاج كميات كبيرة من البروبليس ، إلا أنه كانت الفترة خلال أغسطس ٩٦ هي الأنسب لإنتاج البروبليس وباقي فترات الدراسة على مدار السنة كانت غير مناسبة لإنتاج هذه المادة (البروبليس) حيث كانت الكميات المنتجة من كل طائفة قليلة جداً وغير معنوية.

دراسات بيئية على نشاط نحل العسل بمحافظة شمال سيناء

رسالة مقدمة

من

إيمان ظريف نصر أحمد
بكالوريوس العلوم الزراعية (وقاية نبات) ١٩٩١
كلية الزراعة بمشتهر
جامعة الزقازيق

للحصول على

درجة الماجستير في العلوم الزراعية

حشرات اقتصادية (نحل)

قسم الإنتاج النباتي ووقايته
كلية العلوم الزراعية البيئية بالعريش
جامعة قناة السويس

٢٠٠٠