A List of Important Honeybee Nectariferous and Polleniferous Plant Species in the West Bank Governorates, Palestine

Imadeddin Albaba
P. O. Box 64, Halhul, Hebron Dist, West Bank 741, Palestine

Abstract: The main goal of this study is to provide information about the foraging value of a number of specific plant species for honeybees in Palestine, since one of the limiting factors of Palestine’s apiculture industry is the unpredicted seasonality in the blooming phenology of nectariferous and polleniferous plant species. This limiting factor can be overcome by increasing and diversifying the population of bee forage plant species throughout man made plantations. In this survey, a combination of literature and field surveys were used in order to identify and compile a list of plant species, which are of importance for fulfilling the honeybee’s needs of nectar and pollen. The study was conducted through bi-weekly visit to a numbers of randomly selected sites located in some nature reserves and agricultural fields, within the West Bank Governorates. A total of 143 nectariferous and polleniferous plant species, belonging to 37 families, were identified through direct observation of foraging bees, and/or through literature survey. The dominant families are Compositae with 27 (18.8%) belonging species, followed by Lamiaceae family with 24 (16.7%) belonging species, then followed by Boraginaceae family with 8 (5.5%) belonging species and then followed by other families. The identified plant species was grouped into pollen, nectar and both pollen and nectar sources plant species. The polleniferous plant species group counted 17 which is equivalent to 11.8%; the nectariferous plant species group counted 29 which is equivalent to 20.2%; and the third groups of plant species that have been visited by bees for collecting both pollen and nectar counted 97, which is equivalent to 68%. The chronologies of the blooming plant species were also recorded. It was concluded that any of the studied locations can be profitably utilized for commercial and or large scale beekeeping, if the important limiting factor can be overcome by increasing and diversifying the population of bee forage plant species throughout man made plantations. The paper provides information on the wild and cultivated nectariferous and polleniferous plants that are important for the bees in the West Bank Governorates, Palestine.

Key words: Diversity, honeybees, nectariferous, polleniferous, Palestine.

1. Introduction

Flowers are the mainstay of bee’s life. Honeybee workers make thousands of visits to flowers in order to collect nectar and pollen. Flowering plants of several plant families are blooming at different time intervals of the year [1]. Depending upon the soil type, climatic factors and the habitat of the vegetation, the time of the blossoming may change for even the same nectar plants [2]. Sound information on duration of flowering and blooming time is essential for proper beekeeping management [3]. The practice of beekeeping is not only depends on the better strain of honeybees but also on abundance and occurrence of pollen and nectar sources within the surrounding area of an apiary [4]. The good knowledge of the diversity, density and blooming chronologies of nectariferous and polleniferous species are prerequisite and essential for guiding beekeepers in the choice of the best suitable sites for locating their apiaries and subsequently enhancing the efficiency of beekeeping industry and successful beekeeping. Such enhancement may enable beekeepers to harvest a good yield of honey and other bee products, and increase their own financial profits.
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Literature survey showed that information on local bee forage plants was compiled by several studies conducted by several scientists, like Refs. [1, 5-13]. In the book, Free [1] mentioned that pollen are more efficiently collected and distributed by mechanical means (by insects or wind current) on crop plants which require cross pollination. The author also arranged crops needing pollination by various pollinator insects in general and those plant families pollinated by honeybees, notably Papilionaceae and Rosaceae. Zohary [5] includes the whole area of the West Bank and the Gaza Strip in his flora palestinae multi volume books, which have updated nomenclature, distribution and habitat data for 2,700 species. Fahn [6] identified nectaries of honey plants in the land of Israel, their structure and the effects of ecological factors on nectar secretion. Gindel [7] studied the acclimation of *Eucalyptus* during 1935-1951 in Israel as a potential source of food rewards for honeybees. Lupo and Eisikowitch [8] concluded that *Eucalyptus erythrocoris* is important source of nectar and pollen for honeybees in Israel. In their evaluation study, Dag et al. [9] studied the economic values of bee forage plants planted in Israel. Dag et al. [10] studied the pollen sources for honeybee colonies in Israel. Reves [11], the author of a guide to *Eucalyptus* species growing in Israel, had shown the importance of different species grown for beekeeping purposes. Tamar and Shmida [12] compiled a list of 266 local wild plant species that have high food potential for honeybees in the neighboring state of Israel. Albaba [13] in previous study showed that a total number of 393 species of plants were identified with the recorded species belonging to 57 families, as potential forage plants for bees in the West Bank, Palestine.

The results of identification of the plant species collected in the investigated sites, their systematic, phenology and other information have followed the Israeli website called the Flora of Israel, which is powered by the Hebrew University in addition to Al Sheikh and Salman [14].

2. Material and Methods

2.1 Study Site

The West Bank is mostly located on the Central highlands of Palestine, just above the Jordan valley. It is composed of four climatically differentiated zones. The semi-coastal zone, which is a narrow strip extending at 100-300 m above sea level, in the North-Northwest corner, comprises of Jenin, Qalqilia and Tulkarem districts; soil is mostly alluvial and loam; the annual rainfall is 600 mm. The second climatic zone is Central highlands, which is mountainous rock and hilly area rising up 1,027 m above sea level, includes area from Jenin Southwards until Hebron district and receives annual rainfall around 400 mm. The third zone is Eastern slope zone, comprises of steep mountains with little rainfall (150-300 mm) and represents the semi-desert climate, as transitional area between Mediterranean and desert. The fourth climatic zone is the Jordan valley and lies 390 m below sea level; the soil is brackish with high content ratio of sodium [15].

2.2 Survey of Nectariferous and Polleniferous Species

A combination of literature and field surveys were used in order to identify and compile a list of 143 plant species, which are of importance for fulfilling the honeybee’s needs of nectar and pollen. The study was conducted through bi-weekly visit to the selected sites located in some nature reserves or agricultural fields, which was randomly selected in the West Bank Governorates. In every site visit, four line transects of 1,000 m in length each, were selected and stationed on two separate points in each surveyed site. The start and end of each transect were marked with the national flags to enhance visibility. While moving on the transects each five steps interval, flowering plants found within 2 m radius, were visited and observed for the presence and foraging activities of honeybees within a predetermined period of 10 min. Plants were scored as bee foraging species, when at least three
honeybees had visited and foraged on the flowers within the observation period [16]. Camera shots were used to prove the honeybee’s presence and identification of the plant species.

The literature survey revealed a preliminary list of plants diversity as potential forage plants for bees in the West Bank, Palestine. It was compiled based on field survey and literature survey of many existing references, such as Refs. [3-5, 7, 10, 12, 14, 16, 17]. Plant identification, phenology and other information were obtained basically from Ref. [5], flora of Israel web [18] and the preliminary checklist and ecological data—base of plants of the West Bank [14].

3. Results and Discussion

The study area (the West Bank) is mostly located on the Central highlands of Palestine, just above the Jordan valley, whereas natural forest, agricultural fields and irrigated crops are found. Annex 1 lists 143 species from the native flora of Palestine that were identified as bee forage plants out of an initial list of 393 potential plants. The table also reports these species’ main food rewards and their blooming period in Palestine. Based on the results of this study, a total of 143 nectariferous and polleniferous plant species, belonging to 37 families (Fig. 1), were identified through direct observation of foraging bees, and/or through literature survey.

The results have shown that the most important nectariferous and polleniferous plants species are the representatives of family Compositae (Achillea falcata, Achillea fragrantissima, Achillea santolina, Carthamus glaucus, Carthamus nitidus, Carthamus tenuis, Centaurea hyalographe, Centaurea iberica, Centaurea lanulata, Centaurea pallescens, Centaurea veratum, Chiladenus iphionoides, Crupina crupinastrum, Onopordum alexandrinum, Onopordum blancheanum, Onopordum carduiforme, Onopordum cynaroccephalum, Senecio joppensis, Senecio vernalis, Silybum marianum, Cynara syriaca, Dittrichia graveolens, Dittrichia viscosa, Echinops gaillardottii, Echinops philistaeus, Eupatorium cannabinum, Notobasis syriaca), followed by the representatives of family Lamiaceae (Ballota undulata, Coridothymus capitatus, Lamium moschatum, Lavandula stoechas, Mentha sp., Micromeria fruticosa, Prasium majus, Rosmarinus officinalis, Salvia fruticosa, Salvia hierosolymitana, Salvia indica, Salvia judaica, Satureja thymbra, Sideritis perfoliata, Sideritis pulullan, Stachys distans, Teucrium creticum, Teucrium divaricatum, Teucrium scordium, Trifolium fragiferum, Trifolium palustre, Trifolium purpureum, Trifolium repens, Trifolium resupinatum), then followed by the representatives of family Boraginaceae (Alkanna strigosa, Cynoglossum creticum, Echiochilon fruticosum, Echium angustifolium,
Echium glomeratum, Echium judaeum, Echium plantagineum, Moltkiopsis ciliata), and followed by other families representatives as listed in Annex 1.

The identified plant species was grouped into three groups based on their food rewards: a group of pollen source plants species, a group of nectar source plants species and the third group of both pollen and nectar sources plant species. The results have shown the dominance of the plant species which have been visited for collecting both pollen and nectar, counted 97 (68%). The pollen source plant species counted 17 (12%) and the nectar source species were 29 (17%). Flower morphology and the low pollen productivity of nectariferous plants may affect the quantitative participation of pollen as a food rewards sources to attract bees. Some species of Fabaceae family (Medicago sativa, Melilotus albus) have a secondary period of flowering in late autumn or in summer, which is very important for supplying the honeybees with nectar and pollen during the dry season here in Palestine (Fig. 2).

Column five of Annex 1 provides a classification of the survey species according to their main food elements to honeybees (nectar (N), pollen (P) or both (N+P)). This classification is based on qualitative observations of honeybees behavior and does not express the quantity of nectar or pollen produced per plant or collected by bees. The chronology of main period of blooming plant species were defined as in Fig. 3. The peak blooming period was recorded in April, followed by May, then by March and then by June, etc..

Fig. 3 showed that the months January and December are characterized by a low number of flowering polleniferous and nectariferous plants. This study emphasizes the importance of polleniferous and nectariferous plants for honeybees in the West Bank.
Governorates, Palestine. Their findings demonstrate the fluctuations in pollen and nectar availability for bees throughout the months of the year, which will subsequently affect negatively the honey yields and pollination services. These finding are in agreement with many regional and international studies. The listed plant species are of importance for securing food of honeybees and also contribute to the beautiful landscape. Considering its environmental importance, these plant species are recommended to be protected by competent agencies of the Palestinian authority as well as by the surrounding countries.

4. Conclusions

The author’s findings have led to some conclusions about the local flora visited by honeybees for nectar and pollen grains. A hundred and forty three taxa have been established in the study of importance for the honeybees in Palestine.

It could be concluded that any of the studied locations can be profitably utilized for commercial or large scale beekeeping, if the important limiting factor can be overcome by increasing and diversifying the population of bee forage plant species throughout man made plantations. The results and subsequent conclusion are in agreement with many regional studies.

Six species of the surveyed plants (Hedera helix, Moltkiopsis ciliate, Senecio vernalis, Maresia pulchella, Sinapis alba and Leucophyllum frutescens) produce pollen and nectar, and have long blooming period. Therefore, the author recommend their conservation and planting if possible as pollen and nectar sources, in combination with other plants that can serve as sources of food elements for honeybees in Palestine.

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| No. | Spp. scientific name | Family name | Spp. English name | Food elements | Blooming months |
|-----|----------------------|-------------|-------------------|---------------|-----------------|
| 1   | Asphodeline lutea    | Liliaceae   | Yellow Asphodel   | P & N         | March-May       |
| 2   | Asphodelus aestivus  | Liliaceae   | Asphodel          | P & N         | February-May    |
| 3   | Acer obtusifolium    | Aceraceae   | Syrian Maple      | P & N         | March-May       |
| 4   | Ammi visnaga         | Apiaceae    | Toothpick         | P             | April-August    |
| 5   | Cuminum cyminum      | Apiaceae    | Cumin             | P & N         | March-April     |
| 6   | Eryngium creticum    | Apiaceae    | Field Eryngo      | P & N         | May-August      |
| 7   | Eryngium glomeratum  | Apiaceae    | Sea Holly         | P & N         | May-September   |
| 8   | Eryngium maritimum   | Apiaceae    | Sea Holly         | P & N         | April-August    |
| 9   | Hedera helix         | Araliaceae  | Ivy               | P & N         | January-December|
| 10  | Scilla hyacinthoides| Asparagaceae| Hyacinth Squill   | P & N         | February-April  |
| 11  | Alkanna strigosa     | Boraginaceae| Strigose Alkanet  | N             | March-June      |
| 12  | Cynoglossum creticum | Boraginaceae| Blue Hound’s Tongue| N            | April-May       |
| 13  | Echioclinon fruticosum| Boraginaceae| Bushy Bugloss    | N             | March-June      |
| 14  | Echium angustifolium | Boraginaceae| Hispid Viper’s-bugloss| P & N   | March-August    |
| 15  | Echium glomeratum    | Boraginaceae| Tall Viper’s-bugloss| P & N   | March-June      |
| 16  | Echium judea          | Boraginaceae| Judean Viper’s-bugloss| P & N | March-April     |
| 17  | Echium plantagineum  | Boraginaceae| Purple Viper’s Bugloss| P & N | January-April   |
| 18  | Moltkiopsis ciliata  | Boraginaceae| Callous-leaved Gromwell| N | December-August |
| 19  | Ceratonia siliqua    | Caesalpinaceae| Carob tree      | P & N         | July            |
| 20  | Cercis siliquastrum  | Caesalpinaceae| Cercis           | N             | February-May    |
| 21  | Capparis aegyptiaca  | Capparaceae | Egyptian Caper   | P & N         | March-August    |
| 22  | Capparis sicula      | Capparaceae | Caper            | P & N         | April-October   |
| 23  | Capparis spinosa     | Capparaceae | Spiny Caper      | P & N         | March-August    |
| 24  | Scabiosa palaeastina | Caprifoliaceae| Scabious         | P & N         | March-May       |
| 25  | Scabiosa prolifera   | Caprifoliaceae| Prolific Scabious| P & N | March-May       |
| 26  | Cistus incanus       | Cistaceae   | Hairy Rockrose   | P             | March-June      |
| 27  | Helianthemum vesicarium| Cistaceae  | Pink Sun-rose    | P & N         | January-May     |
| 28  | Achillea falcate     | Compositae  | Sulphur-colored Milfoil| P & N | April-May       |
| 29  | Achillea fragrantissima| Compositae | Lavender Cotton | P & N         | March-May       |
| 30  | Achillea santolina   | Compositae  | Woolly Yarrow    | P & N         | March-May       |
| 31  | Cardamus glaucus     | Compositae  | Glaucous Star Thistle| N & P | May-August      |
| 32  | Cardamus nitidus     | Compositae  | Smooth Distaff thistle| N & P | April-August    |
| 33  | Cardamus tenuis      | Compositae  | Safflower        | N & P         | May-September   |
| 34  | Centaurea hyalolepis | Compositae  | Centaury-thistle | N & P         | March-June      |
| 35  | Centaurea iberica    | Compositae  | Spanish Centaury-thistle| N & P | April-July      |
| 36  | Centaurea lanulata   | Compositae  | Centaury-thistle | N & P         | January-May     |
| 37  | Centaurea pallescens | Compositae  | Centaury         | N & P         | April-August    |
| 38  | Centaurea verutum    | Compositae  | Centaury-thistle | N & P         | May-July        |
| 39  | Chiladienus iphioides| Compositae  | Goldy Locks      | P             | September-November|
| 40  | Crupina crupinastrum | Compositae  | False Saw-wort   | N & P         | March-May       |
| 41  | Onopordum alexandrinum| Compositae | Thistle          | N & P         | March-May       |
| 42  | Onopordum blanchianum| Compositae  | Cotton Thistle   | P & N         | March-June      |
| 43  | Onopordum carduiforme| Compositae  | False Plumed Thistle| N & P | March-June      |
| 44  | Onopordum cynarocophalum| Compositae | Artichoke Cotton-Thistle| N & P | May-July        |
| 45  | Senecio joppensis    | Compositae  | Jaffa Groundsel  | P & N         | January-April   |
| 46  | Senecio vernalis     | Compositae  | spring Groundsel | P & N         | January-December|
| 47  | Silybum marianum     | Compositae  | Milk Thistle     | N & P         | March-May       |
| 48  | Cynara syriaca      | Compositae  | Syrian Artichoke | N & P         | June-August     |
(Annex 1 continued)

| No. | Sp. scientific name | Family name | Sp. English name | Food elements | Blooming months          |
|-----|---------------------|-------------|-----------------|--------------|--------------------------|
| 49  | Dittrichia graveolens | Compositae   | Stinkwort       | P & N        | August-December          |
| 50  | Dittrichia viscosa   | Compositae   | Inula           | P & N        | September-November       |
| 51  | Echinops gaillardotii | Compositae   | Globe Thistle   | N & P        | June-July                |
| 52  | Echinops philistaeus | Compositae   | Pale Globe Thistle | N & P    | May-August              |
| 53  | Eupatorium cannabinum | Compositae   | Common Hemp Agrimony | P & N    | June October            |
| 54  | Notobasis syriaca    | Compositae   | Syrian Thistle  | N & P        | April-June               |
| 55  | Convulvulus althaeoides | Convolvulaceae | Mallow Bindweed | N           | March-June              |
| 56  | Convulvulus dorycnium | Convolvulaceae | Splendid Bindweed | N    | April-July              |
| 57  | Diplotaxis erucoides | Cruciferae   | White Wallrocket | N          | February-March, November-December |
| 58  | Diplotaxis harra     | Cruciferae   | Wall rocket     | N           | January-May              |
| 59  | Eruca sativa         | Cruciferae   | Arugula         | P & N        | February-May             |
| 60  | Maresia pulchella    | Cruciferae   | Pretty Maresia  | P & N        | January-November         |
| 61  | Sinapis alba         | Cruciferae   | White Mustard   | P & N        | January-December         |
| 62  | Sinapis arvensis     | Cruciferae   | Charlock        | P & N        | March-May                |
| 63  | Zilla spinosa        | Cruciferae   | Spiny Zilla     | N           | January-May              |
| 64  | Raphanus raphanistrum | Cruciferae   | Sea-Radish, White Charlock | N | January-May               |
| 65  | Echallium elaterrium | Cucurbitaceae | Squirtung Cucumber | N & P | May-October            |
| 66  | Cephalaria jappensis | Dipsaceae    | Jafa Scabious   | P & N        | May-September            |
| 67  | Arbuthus andrachne    | Ericaceae    | Eastern Strawberry Tree | N | March-April             |
| 68  | Lupinus pilosus      | Fabaceae     | Blue Lupine     | P           | February-April           |
| 69  | Prosopis farcta      | Fabaceae     | Prosopis        | P & N        | May-August               |
| 70  | Lotus collinus       | Fabaceae     | Judean Bird’s-foot Trefoil | P & N | March-May               |
| 71  | Lotus creticus       | Fabaceae     | Silvery Bird’s-foot Trefoil | P & N | March-August             |
| 72  | Lupinus palaestinus  | Fabaceae     | Palestine Lupine | P | February-May            |
| 73  | Medicago sativa      | Fabaceae     | Buffalo Herb    | P & N        | April-July               |
| 74  | Melilotus albus       | Fabaceae     | Yellow Melilot  | N & P        | April-October            |
| 75  | Hypericum triquetrifolium | Gluciaceae | Tumble St. John’s-wort | P | May-September            |
| 76  | Moluccella laevis    | Labiatae     | Molucca Balm; Shell Flower; Bells of Ireland | N | April-July               |
| 77  | Origanum syriacum    | Labiatae     | The Rose of Jericho | N & P | January-September      |
| 78  | Ballota undulata     | Lamiaceae    | Common Ballota  | N           | April-October            |
| 79  | Coridothymus capitatus | Lamiaceae   | Cone Head Thyme | P & N    | May-October              |
| 80  | Lamium moschatum     | Lamiaceae    | Musky Archange  | N           | March-April              |
| 81  | Lavandula stonechas  | Lamiaceae    | French Lavender; Spanish Lavender | N | February-May             |
| 82  | Mentha sp.           | Lamiaceae    | Mint            | N           | June-July                |
| 83  | Micromeria fruticosa | Lamiaceae    | White Leaved Savory | P & N | February-June            |
| 84  | Prasium majus        | Lamiaceae    | Great Hedge-nettle | N | July-October            |
| 85  | Rosmarinus officinalis | Lamiaceae   | Rosemary        | N           | March-September          |
| 86  | Salvia fruticosa     | Lamiaceae    | Greek Sage      | N           | March-June               |
| 87  | Salvia hierosolymitana | Lamiaceae   | Jerusalem Sage  | P & N        | March-July               |
| 88  | Salvia indica        | Lamiaceae    | Wild Sage       | P & N        | April-May                |
| 89  | Salvia judaica       | Lamiaceae    | Judean Sage     | P & N        | April-June               |
| 90  | Satureja thymbra     | Lamiaceae    | Savory of Crete | N           | March-July               |
| 91  | Sideritis perfoliata | Lamiaceae    | Mountain Tea    | N           | June-October             |
| 92  | Sideritis pullulans  | Lamiaceae    | Branching Ironwort | N | May-October            |
| 93  | Stachys distans      | Lamiaceae    | Lamb’s Ear      | N           | May-June                 |
| 94  | Teucrium creticum    | Lamiaceae    | Cretan Germander | N & P    | May-September           |
| No. | Spp. scientific name | Family name | Spp. English name | Food elements | Blooming months |
|-----|----------------------|-------------|-------------------|---------------|-----------------|
| 95  | Teucrium divaricatum | Lamiaceae   | Spreading Germander | P & N         | April-June      |
| 96  | Teucrium scordium    | Lamiaceae   | Water Germander    | P & N         | June-October    |
| 97  | Trifolium fragiferum | Lamiaceae   | Strawberry Clover  | N             | April-May       |
| 98  | Trifolium palaestinum| Lamiaceae   | Palestine Clover   | P & N         | April-May       |
| 99  | Trifolium purpureum  | Lamiaceae   | Purple Clover      | P & N         | April-May       |
| 100 | Trifolium repens     | Lamiaceae   | Dutch Clover       | N             | April-May       |
| 101 | Trifolium resupinatum| Lamiaceae   | Trifolium Pink Clover | P             | April-May       |
| 102 | Urginea maritima     | Liliiaceae  | Sea-squill         | P & N         | July-October    |
| 103 | Alcea dissecta       | Malvaceae   | Bristly Hollyhock  | P & N         | April-July      |
| 104 | Alcea setosa         | Malvaceae   | Hollyhock          | P & N         | April-June      |
| 105 | Eucalyptus sp.       | Myrtaceae   | Eucalyptus         | N             | February-May,  |
|     |                      |             |                   |               | August-December |
| 106 | Glaucium flavum      | Papaveraceae| Yellow-horned Poppy| P             | April-August    |
| 107 | Glaucium grandiflorum| Papaveraceae| Red-horned Poppy   | P             | April-May       |
| 108 | Anagyris foetida     | Papilionaceae| Mediterranean Stinkbush | P | January-April |
| 109 | Ononis alpeoguroides | Papilionaceae| Foxtail Rest Harrow| P             | April-May       |
| 110 | Ononis hirta         | Papilionaceae| Hairy Rest Harrow | P             | March-May       |
| 111 | Ononis natrix        | Papilionaceae| Sticky Rest Harrow | P             | April-September|
| 112 | Ononis pubescens     | Papilionaceae| Downy Rest Harrow | P             | March-July      |
| 113 | Retama raetam        | Papilionaceae| White Broom       | N & P         | March-April     |
| 114 | Calligonum comosum   | Polygonaceae| Calligonum Fringed| N & P         | February-April  |
| 115 | Anemone coronaria    | Ranunculaceae| Crown Anemone     | P             | February -May   |
| 116 | Clematis cirrhosa    | Ranunculaceae| Virgin’s Bower    | P & N         | November-February|
| 117 | Clematis flammula    | Ranunculaceae| Sweet Virgin’s Bower | P & N | April-June     |
| 118 | Reseda alba          | Resedaceae  | White Upright Mignonette | P & N | February-April |
| 119 | Reseda boissieri     | Resedaceae  | Mignonette         | P & N         | February-May    |
| 120 | Reseda decursiva     | Resedaceae  | Mignonette         | P & N         | February-November|
| 121 | Reseda lutea         | Resedaceae  | Yellow Mignonette  | P & N         | March-June      |
| 122 | Reseda muricata      | Resedaceae  | Mignonette         | P & N         | March-April     |
| 123 | Reseda orientalis    | Resedaceae  | Oriental Mignonette | P & N | December-February|
| 124 | Rhamnus lycioides    | Rhamnaceae  | Palestine Buckthorn| P & N         | January-April   |
| 125 | Ziziphus spina-christi| Rhamnaceae | Christ’s Thorn Jujube | P & N | April-October   |
| 126 | Amygdalus communis   | Rosaceae    | Common Bitter Almond| P & N | February-March  |
| 127 | Amygdalus korschinskii| Rosaceae | Wild Almond         | P & N         | February-March  |
| 128 | Amygdalus sp.        | Rosaceae    | Almond             | P & N         | February-March  |
| 129 | Prunus avium         | Rosaceae    | Sweet Cherry       | P & N         | March-April     |
| 130 | Prunus domestica     | Rosaceae    | Plum               | P & N         | March-April     |
| 131 | Prunus persica       | Rosaceae    | Peach              | P & N         | March-April     |
| 132 | Prunus ursina        | Rosaceae    | Bear’s Plum        | P & N         | March-April     |
| 133 | Citrus spp.          | Rutaceae    | Lemon              | P & N         | April-June      |
| 134 | Salix alba           | Salicaceae  | Willow             | P & N         | March-June      |
| 135 | Verbasium galilaeum  | Scrophulariaceae| Common Mullein   | P             | April-July      |
| 136 | Verbasium sinaicum   | Scrophulariaceae| Sinai Mullein      | P             | April-July      |
| 137 | Verbasium sinaatum   | Scrophulariaceae| Scallop-leaved Mullein | P | April-October |
| 138 | Syringa officinalis  | Styracaceae | Storax Tree        | N & P         | March-April     |
| 139 | Tamarix aphylla      | Tamaricaceae| Athel Pine         | P & N         | July-November   |
| 140 | Tamarix tetragnata   | Tamaricaceae| Tamarisk           | P & N         | March-May       |
| 141 | Phylla nodiflora     | Verbenaceae | Sawtooth Fogfruit  | N             | April-September |
| 142 | Nitaria retusa       | Zygophyllaceae| Salt Tree        | P & N         | April-May       |
| 143 | Zygophyllum dumosum  | Zygophyllaceae| Bushy Bean Caper Plant | P & N | February-April |

P = pollen and N = nectar.