1966

The need for Organized Information on Crop Pollination and Pollinators

George E. Bohart
Utah State University

Follow this and additional works at: https://digitalcommons.usu.edu/piru_pubs
Part of the Entomology Commons

Recommended Citation
THE NEED FOR ORGANIZED INFORMATION ON CROP POLLINATION AND POLLINATORS

George E. Bohart, Entomology Research Division
ARS, USDA, in cooperation with the Utah Agricultural Experiment Station.

Pollinators other than honeybees may assume importance in the pollination of agricultural crops in a variety of circumstances.

Although most insect-pollinated crops are effectively pollinated by honeybees, especially in temperate regions, problems often arise from competition with more attractive bloom. For example, since alfalfa seed became an important crop in Idaho, the large vegetable seed industry there has been suffering because most of the honeybees now fly to alfalfa at a time when they are needed on carrot, onion, dill and vegetable seed fields. "Wild" pollinators that are not attracted to alfalfa are now taking on greater importance, but no attempt is being made to encourage them. When the encouragement of other insects is a more practical approach than saturating the area with a "super-abundance" of honeybees is not known.

Some important seed and fruit crops require insect pollination but are rarely, if ever, pollinated by honeybees. The Smyrna fig, for example, is pollinated by Blastophaga wasps, and cocoa is pollinated by ceratopogonid flies. No significant pollinator is known for vanilla, but on the basis of the characteristics, it would seem that certain species of moths should be effective. At present the vanilla industry depends on hand pollination. A number of flower seed crops, although minor in importance, belong to this category. As examples, I can cite pansies and scarlet sage.

A similar situation exists with regard to hybrid seed production in many crops that are self-pollinating and ordinarily have little need for insects. These are often quite unattractive to honeybees. Examples include peas (Pisum), beans (Phaseolus and others), tomatoes, and peppers. Although most cotton varieties produce lint and seed satisfactorily by automatic self-pollination, hybrid seed definitely requires insects. Cotton is visited rather freely by honeybees but not very efficiently in terms of pollination. Among the minor crops, hybrid seeds of such flower crops as petunias and autirrhinums could be placed in the above category.

Several important crops that are not self-pollinating are visited more or less freely by honeybees, at least under conditions of limited competition, but honeybees are not entirely satisfactory as pollinators. Alfalfa and red clover are outstanding examples; others are somewhat less important crops such as hairy vetch, broad beans, bird's-foot trefoil, milk vetch and passion fruit.

Finally, apples provide an example of a crop that is pollinated satisfactorily by honeybees in normal weather, but in inclement weather depends on bumble bees or hand pollination.
The above statements do not cover all situations and crops where "wild" pollinators are desirable, but they indicate the scope of the problem. Intensive studies of pollination by insects other than honeybees have been made for only a few crops. Alfalfa, red clover and the Smyrna fig head the list. There are also crops for which specific attempts have been made to encourage various pollinators, and to increase pollinator distribution by means of introductions. Many years ago bumble bees were introduced into New Zealand for red clover, and Blastophaga into California and other places for the Smyrna fig, but only in the last few years have purposeful introductions of pollinators for alfalfa been made.

In the United States the distribution of the alfalfa leaf-cutting bee (Megachile rotundata Fabr.) has been increased somewhat by interstate shipments. Introductions to Canada have also been made with some success. In 1963 and 1964 shipments were made to France. M. rotundata presumably already existed there, but recent studies indicate that the native French bee is different from that in the U.S. Last fall a shipment of the alfalfa leaf-cutting bee was made to Chile; according to the latest report, they had increased at least five-fold.

Introductions of alkali bees (Nomia melanderi Ckll.) have also been made, but so far most of them have not proved successful. These introductions have been made to areas where the alkali bee is probably not adapted (for example, western France and eastern South Dakota); furthermore, nesting ground must usually be carefully prepared and maintained for this bee. Nevertheless, an attempt will be made to introduce it to New Zealand next season. Many other areas, such as northern Chile, south-eastern Europe and parts of Australia, would seem to be more suitable.

With the foregoing as a background, I would like to plead for the development of more and better organized information concerning the insect pollination needs of agricultural crops, and concerning all crop pollinators of actual or potential importance. Obviously, in the beginning, considerable progress could be made by assembling and systematizing existing information. With this as a framework, new information could be collected and organized along the same lines. Ultimately this information, perhaps appearing in mimeographed form with supplements as needed, would serve as a useful guide for anyone interested in the pollination needs of specific crops and in potential pollinators for them. It should also be an indispensable guide for future efforts to introduce pollinators to areas where they are most needed and most likely to succeed.

Before anyone suggests that this information be compiled at Logan, I would like to point out the merits of having it done at an institution that is better organized, better staffed, and more experienced in this kind of effort. The Bee Research Association, or perhaps the Station for Research on the bee and Social Insects at Bures-sur-Yvette, should be well qualified. Perhaps members of the Symposium could make other suggestions.
If the present assembly considers this to be a worthy effort, I would like to suggest that a committee be formed to decide where the project should be undertaken, how it should be organized, what kinds of information should be collected, how it should be made available, and other such matters. A prospectus could then be sent to everyone interested for further comments and recommendations.

Although most insect-pollinated crops are effectively pollinated by honeybees, especially in temperate regions, problems often arise from competition with more attractive blooms. For example, since alfalfa seed became an important crop in Idaho, the large vegetable seed industry there has been suffering because most of the honeybees now fly to alfalfa at a time when they are needed on carrot, onion, dill and vegetable seed fields. "Wild" pollinators that are not attracted to alfalfa are now taking on greater importance, but no attempt is being made to encourage them. When the encouragement of other insects is a more practical approach than saturating the area with a "super-abundance" of honeybees is not known.

Some important seed and fruit crops require insect pollination but are rarely, if ever, pollinated by honeybees. The Smyrna fig, for example, is pollinated by Blastophaga wasps, and cocoa is pollinated by ceratopogonid flies. No significant pollinator is known for vanilla, but as the harle of the characteristics, it would seem that certain species of moths should be effective. At present the vanilla industry depends on hand pollination. A number of flower seed crops, although minor in importance, belong to this category. As examples, I can cite pansies and scarlet sage.

A similar situation exists with regard to hybrid seed production in many crops that are self-pollinating and ordinarily have little need for insects. These are often quite unattractive to honeybees. Examples include peas (Pisum), beans (Phaseolus and others), tomatoes, and peppers. Although most cotton varieties produce lint and seed satisfactorily by automatic self-pollination, hybrid seed definitely requires insects. Cotton is visited rather freely by honeybees but not very efficiently in terms of pollination. Among the minor crops, hybrid seeds of such flower crops as petunias and antirrhinums could be placed in the above category.

Several important crops that are not self-pollinating are visited more or less freely by honeybees, at least under conditions of limited competition, but honeybees are not entirely satisfactory as pollinators. Alfalfa and red clover are outstanding examples; others are somewhat less important crops such as hairy vetch, broad beans, bladefoot trefoil, milk vetch and passion fruit.

Finally, apples provide an example of a crop that is pollinated satisfactorily by honeybees in normal weather, but in inclement weather depends on humble bees or hand pollination.