Principal Pollinators of Alfalfa in South Russia

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South Russia is considered the favourable region for alfalfa seed production. Alfalfa seed yields considerably depend on climatic conditions and activity of wild bees. Only wild solitary bees and bumblebees are effective alfalfa pollinators. Alkali bees (Andrena labialis Kirby, A.ovatula Kirby.,A.flavipes Pz., A.variabilis Sm., Melitta leporina Pz., Halictus eurygnathus Bl., H. Morbillosus Kriechb., Eucera clipeata Erichs., E. Nitidiventris Mocs., E. Interrupta Baer, Rhophitoides canus Ev.) make burrows in compressed soil with weak plant cover and warmed thoroughly by sunlights.Every bee female makes nest at a depth of about 25 cm; group of individuals forms nest colonies persisting for many years. Stem bees (Osmia coerulescens L., Megahile centuncularis L.) build nests in holes of tree trunks or herbaceous plants with hollow stems. Honey bees collecting nectar actively visit alfalfa fields but they don’t pollinate them practically. Compare to 1933-1934 years (Kostylev, Vinogradov, 1934) the population density of pollinators reduced by several times.

To improve the density of wild bees in alfalfa stands we carried out investigations in two directions: to create conditions for nesting and feeding local species of wild bees and bumblebees, to breed leaf-cutting bees introduced from Canada using artificial conditions of storage and incubation.

Results of field and laboratory trials showed effectiveness of alfalfa seed stands in grass-grain rotations with different cultivars. They are actively visited by wild bees and bumblebees and have minimum common pests with alfalfa. Comparative study of grain-row crop rotation(3 year) and special seed production crop rotation when perennial leguminous and cereal grasses were grown more than10 years showed better pollination in special crop rotations. For the period of investigation bees density in grain-row crop rotation was 0,2-1,5 thousand insects per hectare, in special- from 3,3 to 4,0 thousand/ha.

Although alfalfa seed yields cannot be regarded as linear function of pollinators density but it evidently depends on supply of seed plots with wild bees. Pollination of alfalfa in grain-row crop rotation was below fifty percent of tripped flowers, the rate of untripped flower drop was 35-95 %.

Retaining of local wild bees doesn’t solve the problem of supplying alfalfa seed fields with pollinators because it is difficult to control pests and diseases as well as unfavourable climatic conditions. Optimum pollinators density becomes possible only when wild bees are bred artificially.

Observations of leaf-cutting bee biology and its adaptation under conditions of South Russia proved that Megachile rotundata is a promising pollinator of alfalfa seed fields. Female bees M.rotundatalike local stem bees tripped 9-10 flowers/min and provided rise seed yields by 140-200 kg/ha.