An Importation of Potentially Varroa-Resistant Honey Bees from Far-Eastern Russia

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In an earlier report (ABJ 135: 11, 746-748) we described the initiation of a project to evaluate the potential for resistance to Varroa jacobsoni *by honey bees from the Primorsky Territory on Russia's Pacific coast.* Apis mellifera *is not native to the area, but was first moved there in the last century. At that time, pioneers from western Russia took advantage of the completion of the Trans-Siberian Railway and moved honey bees from European western Russia to Primorsky Territory in Asian far-eastern Russia. This far-eastern area of Russia is within the natural range of* Apis cerana, *the original host of* V. jacobsoni. *Thus,* A. mellifera *was brought into the likely range of* V. jacobsoni *even before the parasite was scientifically described in 1904. This probable long association of* V. jacobsoni *and* A. mellifera *in the region has engendered one of the best opportunities in the world for* A. mellifera *to develop genetic resistance to* V. jacobsoni.

We first explored whether such resistance might be found in Primorsky populations of honey bees in the autumn of 1994. During a two-week trip, data were collected showing that colonies in the area did have varroa mites infesting them, but that the levels of infestation seemed low in comparison to colonies we studied in the United States.

This observation led to the development of a project to further evaluate the possibility that the honey bees of the region have some resistance to the parasite. In June 1995, a test apiary was established in Primorsky. Queens from a variety of sources in the territory were introduced into 50 colonies in this apiary. The colonies were first treated with acaricide to assure generally low levels of *V. jacobsoni* infestation, and then mite levels were approximately equalized among colonies. Thereafter, no treatments for mite control were undertaken. Not only were chemicals avoided, colonies were allowed to rear drones which is in contrast to usual beekeeping practice for the area. During active brood rearing periods, monthly determinations of *V. jacobsoni* infestation rates were made for worker and drone brood. For each colony examined, 100 cells of worker brood and up to 100 cells of drone brood (depending upon availability) were opened and inspected for infesting varroa mites. Data were collected from August 1995 until September 1996. Since it was not possible to import queens from the United States into Russia for a comparative test, similar data were collected from untreated colonies in apiaries in Baton Rouge, Louisiana during approximately the same period .

The data show interesting trends of varroa infestaton. Worker brood infestation (Figure 1) remained quite low in the Primorsky honey bees. Even 15 months after the last treatment, the average infestation was only 7 %. In the United States, 12 months after treatment, the average infestation was 33% and many colonies were collapsing with "parasitic mite syndrome". In the summer of 1996, the average infestation in the United States colonies rose substantially, but did not rise in the Russian colonies.

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Fig. 1 - Worker Brood Infestation

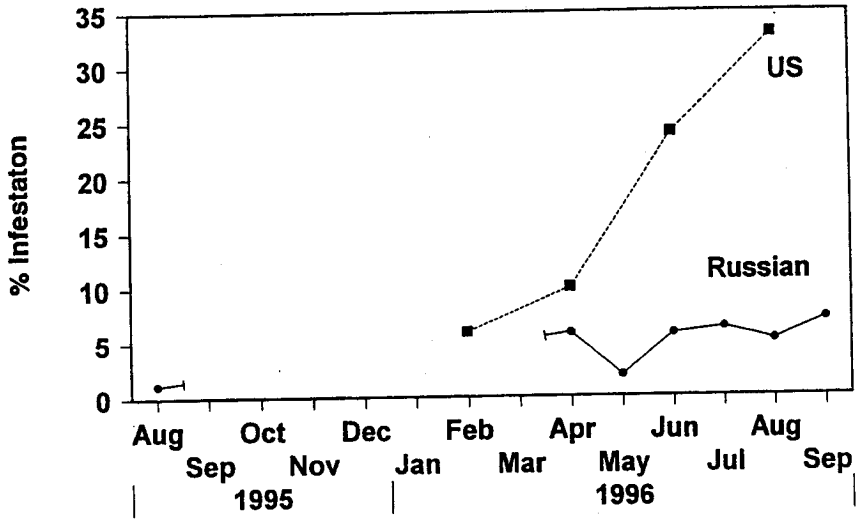
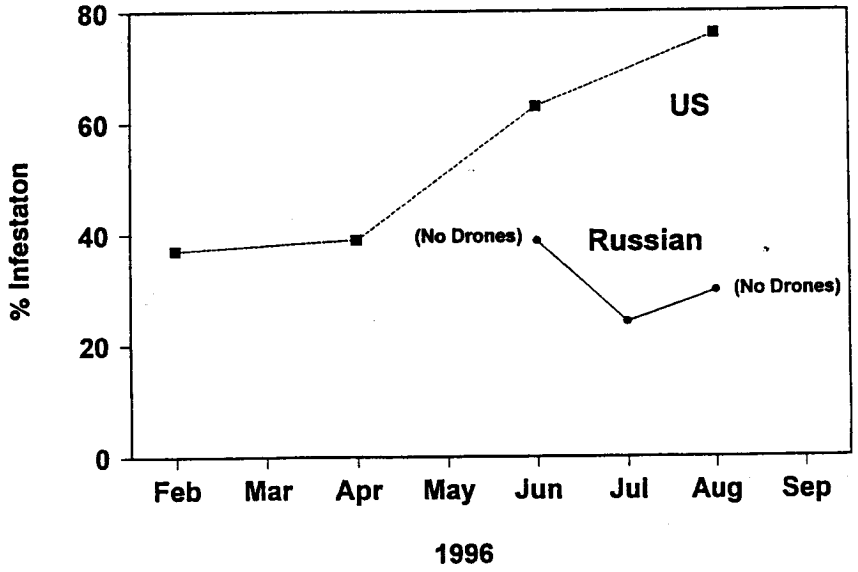


Fig. 2 - Drone Brood Infestation



A similar difference occurred in drone brood infestations (Figure 2). In colonies in both areas varroa infestations were higher in drones. In Russian colonies, the highest average infestation of 39% occurred in June 1996 and average infestations declined thereafter. In United States colonies, infestation rates began at 37% and continued to rise to an average of 76% in August 1996. At this time, the colonies were treated with Apistan in order to keep them from dying.

Because the two sets of data were not collected in the same place under the same conditions, a direct comparison of the data from Russia and the data from the United States cannot be used to conclude that the Russian bees showed or did not show resistance to varroa. However, even if a direct comparison could have been made in Russia, the results would have been conditional upon the beekeeping and environmental conditions in Russia. The comparatively low infestations in the Russian colonies could have resulted from specific aspects of the Primorsky environment, specific traits of the mites in Primorsky, genetically-based resistance to infestation by the Primorsky honey bees, or some combination of all of these things. The only sure way to determine if the encouraging results we saw in Primorsky were due to genetic resistance will be to test the bees in United States conditions with United States mites.

Consequently, in late June 1997 a collection of 100 Primorsky honey bee queens was made and brought to the United States for further research. These queens were obtained from 16 separate beekeepers from a variety of places in Primorsky (Figures 3 and 4). Some queens were grafted by beekeepers in preparation for providing queens. The collection of open-mated queens represented a total of 57 queen mothers. From the Russian experiment, two queens which produced colonies having some of the lowest rates of infestation in the trial were each used to produce 10 daughter queens.

The queens were brought to the USDA, ARS, Honey Bee Quarantine Station at Grand Terre Island, Louisiana, on July 1, 1997 and installed into colonies prepared for them. The introduction was monitored by APHIS and the Louisiana Department of Agriculture and Forestry. Queens and attendant bees were examined microscopically for external parasites prior to queen introduction. Worker bee attendants were frozen and will be examined for the presence of viruses by staff of the USDA, ARS, Bee Research Laboratory in Beltsville, Maryland. As colonies develop, they will be monitored for the presence of disease and parasites. The colonies in the quarantine apiary were headed by queens of four United States commercial stocks. This situation will help determine if any diseases or parasites which might have been brought in with the Primorsky queens

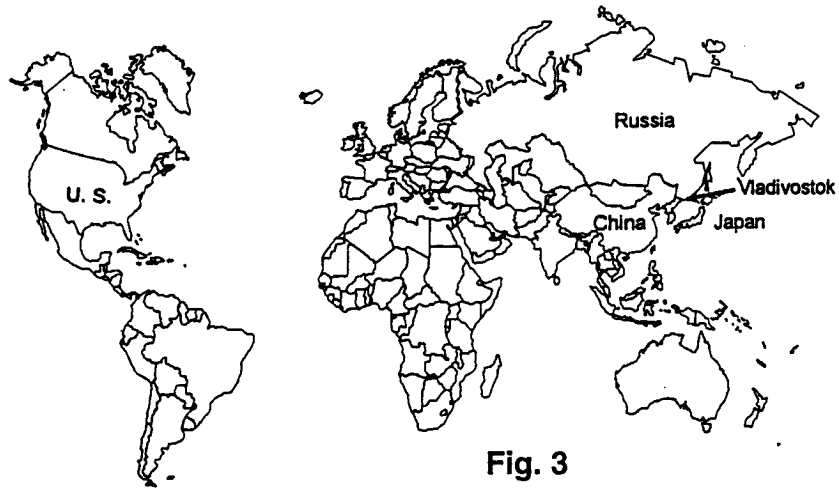
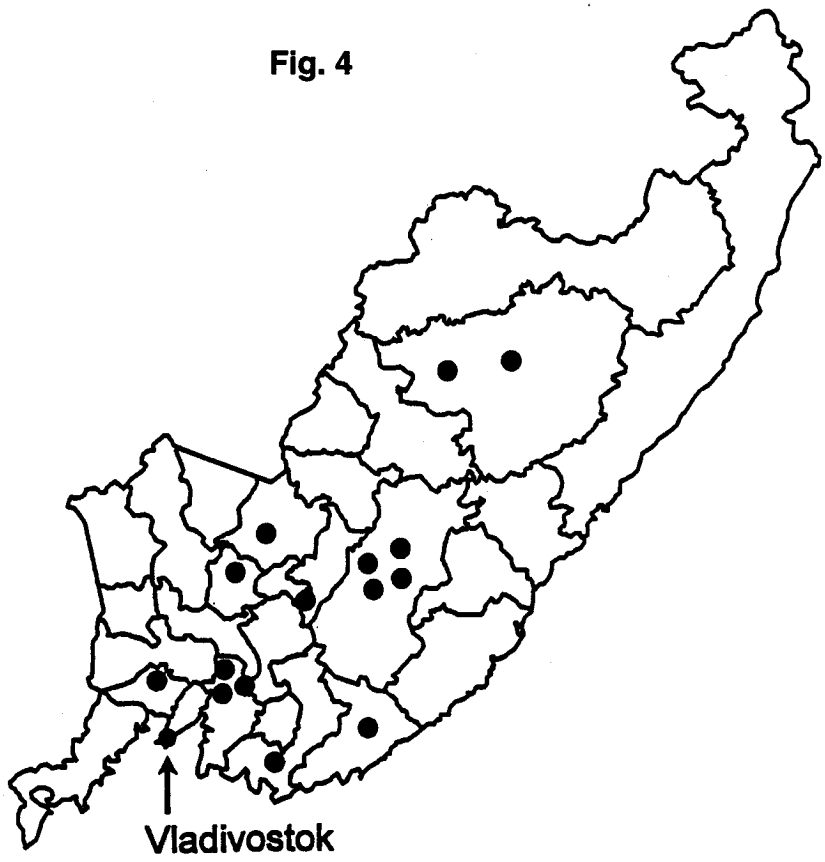


Fig. 3

Fig. 4



affect some stocks more than others. Some colonies headed by queens of each of the United States stocks remain in the apiary as an additional check for the presence of slowly developing diseases.

The importation of queens from Primorsky is composed of a germplasm collection rather than a stock. Hence, the performance of one queen or group of queens does not predict the performance of any of the other queens. The progeny of each queen will need to be individually evaluated for resistance to varroa and other traits such as gentleness and production. Following such evaluations, a breeding design will be developed to create a stock that will have uniform traits.

Following the development of a stock, experiments will be needed to make firm conclusions regarding the potential value of Primorsky honey bees for United States beekeeping. These various tasks are expected to take at least a full year. The safeguards of the quarantine procedures and subsequent scientific study will assure that if the stock is released to the industry, it will be both free of new diseases and pests and useful to the United States beekeeping industry.

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