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Study on the Relation between Soybean Varieties and Multiplication of Soybean Aphids.

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I studied the soybean aphid *Aphis glycines Matsumura*, which is considered a pest on soybeans, in a two-year period starting November of 1946. In my research, I identified 5 related species classified according to Backer: apple aphid (*Aphis pome*), Oleander [*Nerium indicum*] aphid *(Aphis nerii*), cotton aphid (*Aphis gossypii*), beef-steak plant aphid (*Aphis perillae*), and Japanese chaff flower [*Achyranthes japonica*] aphid Aphis sp.

Aphids observed on soybeans were reported by Shindo (1941, 1943) and Hori (1929), and I likewise found soybean aphid, bean aphid (*Aphis laburni*), green pea aphid (*Acyrthosiphon pisi*), and potato aphid (*Aulacorthum solani*). In addition, I was able to collect many samples of *Myzocallis zelkowae*, found exclusively in the winged-form on the zelkova tree, bringing to five the number of aphid species which I observed on soybeans. In Kyoto, species distribution was assessed more than ten times during the period of June to December of 1947. Only the soybean aphid was found consistently from June 29th to December 9th. The winged-form of bean and both winged and non-winged parthenogenic progeny of green pea aphids were found on the young leaves immediately following sowing. Green pea aphids were not observed in the experimental field beyond early July. Jumping forms of *Myzocallis zelkowae* were collected from early July until the middle of October. Soybean aphids were found as far north as Hokkaido and as far south as Kyushu and also in Taipei [Taiwan], Manchuria, Thailand and British Malay Kuala Lumpur.

I will now discuss the propagation of aphids on soybeans having different planting dates, at a specific number of days of growth. Seeds of the *Ani* ("brother") variety of soybean were sown in unfertilized field soil 1 month prior to inoculation and transplanted to clay pots in an incubator two days before inoculation. Each plant received a single aphid from a batch of aphids which were parthenogenically born from a single parent and which initiated parthenogenesis on the day of inoculation. Ten days after inoculation, aphids on each plant were counted. Propagation studies were repeated each month from July to November with the following average aphids per plant: July, 16 aphids; August, 69.7; September, 42; October, 29.4, November, 5; with a maximum in August and gradual decline into November.

Next, I will discuss the propagation of aphids on different varieties of soybean. On September 15th, seeds from 20 varieties of soybean were planted 30cm apart into experimental field soil which had received approximately 4kg of ammonium sulfate, 1.6kg of superphosphate of lime, 3kg of wood ash, and 4kg of sake lees per *tan* (approximately 0.1 hectare) prior to seeding. Plants were cultivated agronomically, transferred to pots (diameter 26cm, height 23cm) on August 11th, and moved into the greenhouse on August 13th. One plant of each variety was put into each of three differing greenhouse environments: A, B, and C. Aphids born on August 16th and which were the seventh-generation of a single aphid that had emerged from its winter host on June 29th were used as inocula. Five aphids were placed onto each plant on August 19th, and their progeny were counted on September 8th. Varieties with low propagation were *Suisen, Tamanishiki, Nakateppo,* with the lowest being *Hakubyosen*. Varieties with high propagation were *Ohtama* and *Ichigososeidaizu*; the *tsurumame* pea *Glycine ussuriensir* Regelt et Maock, which is thought to be a white-bean variety of soybean, had an average of 250 aphids per plant. Investigating possible relationships between propagation level and variety characteristics revealed

a strong negative correlation (0.623 ± 0.09) with the angle formed between the stem and the first branch, in other words the branch angle, with higher propagation associated with smaller angles, suggesting a relationship with micro-climate. Little relationship was found with trichome density.

Translator's comments:

- The author often used long, compound sentences common to Japanese at the time. I split those sentences into two or more sentences when appropriate.
- The author used first-person, and so this is reflected in translation.
- *Line 2*. In the original, the scientific name of the aphid being studied is given as *Aphis glycines Matsumua*; However, *Matsumua*, which I assume to be a person or place name, is unlikely in Japanese. Rather, I think the species name was meant to have been *Matsumu**r**a*.
- *Lines 3 ~ 5*. Common names of aphid species are direct translations of Japanese common names. It may be that there are different common names in English for those species.
- *Lines 13,23*. The author used the term "living-birth" (as opposed to birth from eggs) with regards to aphid progeny. I took this to mean "parthenogenesis" (lines….), because I do not know much about entomology. Is this correct?
- *Lines 37 ~ 39*. Soybean variety names are given as italicized romanizations of Japanese names. However, Chinese characters used for names may be read differently from when they are used commonly, and the actual variety names may differ.