Distribution of Empoasca kraemeri (Ross and Moore) in the Field Bean Phaseolus vulgaris (L.)

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Studies on resistance of field beans to Empoasca kraemeri (Ross and Moore) have been conducted for several years with the purpose of identifying sources of resistance to be used in breeding programs. One of the phases of these studies includes the process of counting and recording the number of nymphae on leaves. Estimates of means and variance were obtained from these data in order to investigate how close the countings approached the Poisson distribution.

The probability distribution function of the Poisson model is given by

$$f(x) = \frac{m^x e^{-m}}{x!}, \quad x = 0, 1, 2, \ldots$$

where m is a parameter and x's are observations. Estimates of m can be substituted in the formula to compute the probability of finding 0, 1, 2, ... nymphae on leaves taken at random. From these probabilities, the theorical expected frequency of leaves having 0, 1, 2, ... nymphae can be computed and compared with the observed frequency. However, this type of comparison will not be presented here since the data are based on averages without regard to the frequency of the various classes. For the same reason, a goodness-of-fit test will not be presented. Only estimates of mean and variance will be shown.

It is well known that for the Poisson distribution the mean and variance are of equal magnitude. Therefore, a comparison of the estimates of these two parameters will furnish some evidence whether the population sampled follows a Poisson distribution law. Estimates for this type of comparison are presented in Table 1.

TABLE 1. - Estimates of mean and variance in samples taken from 1957 through 1962.

SAMPLE	MEAN	VARIANCE
1957	2.57	5.46
1957	2.90	1.69
1957	2.13	2.73
1958	6.81	2.16
1960	4.86	2.55
1961	8.93	8.06
1962	4.83	2.60

Although in some cases the results fit the model assumed quite well, the inconsistence of the estimates may indicate that this insect population does not follow a Poisson distribution law. Nevertheless, certain instincts in the life of the insect appear to conform with the assumptions required for the model since observations of entomologists at this research center have indicated that nymphae have no preference for any particular leaf of the plant and that the distribution is at random over the field. The results shown here have encouraged the authors to undertake a more extensive sampling scheeme with the purpose of testing other statistical models.

New Bean Varieties for Colombian Farmers

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The Division of Agricultural Investigations (DIA) of the Ministry of Agriculture, Colombia, South America, has worked intensively in the development of high yielding and disease resistant dry bean varieties for the various zones where this crop is grown.

The first new variety was released in 1957 under the name of Diacol Nutibara. (All new varieties are given a compound name. The first name, Diacol, means DIA Colombia. The second is a regional name.) This variety was produced from selection in progenies of a cross between a Colombian commercial variety, named Algarrobo, and a Mexican black bean registered as Mexico 11. Diacol Nutibara is primarily adapted to altitudes ranging from 3,800 to 5,300 feet and combines the desirable seed characteristics of Algarrobo with disease resistance of Mexico 11. It is highly resistant to the three major diseases of its range of adaptability namely, angular leaf spot caused by Isariopsis griseola Sacc., anthracnose caused by Colletotrichum lindemuthianum (Sacc. and Mgn.) Scrib. and rust caused by Uromyces phaseoli var typica Arth.

In 1959 a second variety was released under the name of Diacol Nima which came from the cross Algarrobo x Peru 5. This new variety has been very successful in the Cauca Valley, a region of about 3,00 feet above sea level, and it is very popular among bean growers not only for its high yielding ability but also for its unusual adaptability to dry weather conditions which enables it to produce a crop at relatively low levels of soil moisture. During the last four years this new variety has maintained an average yield which represents an increase of 50 per cent over the commercial varieties commonly grown in the region. In addition to high yield and drought resistance, Diacol Nima shows resistance to anthracnose and angular leaf spot but is moderately susceptible to rust.

More recently, two additional new varieties have been developed. One of them, named Diacol Andino, is adapted to the high altitude plains of the Andes. The other, named Diacol Catio, has the same range of adaptability as the variety Diacol Nutibara described above. Diacol Andino came from a cross between two native varieties and shows some degree of resistance to anthracnose and rust. Two of the most signigicant features of this variety are earliness and determinate habit of growth which have made it