Willcox's Agrobiology: IV. Review of Willcox's Reply

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The July, 1954, issue of Agronomy Journal contains a series of three papers, in which the authors set forth a theoretical and experimental examination of the subject matter of "Willcox's Agrobiology." The same issue contains another series of four papers representing Willcox's reply. In reviewing his reply, we may first pass through our papers, taking the headings that point up the criticisms, and giving what we consider to be Willcox's reply:

1. Early contradiction.—Willcox states that the early contradiction should be attributed to the lack of "perspective that comes only with wide observation."

2. Willcox's "derivation" of the nitrogen constant 318. —No satisfactory reply. Willcox merely gives his original words in a different permutation.

3. The Mitscherlich equation.—a. Validity. Nothing new is added by Willcox, except that he quotes the "rule of halved increments." This "rule" is mathematically equivalent to the Mitscherlich equation. b. Constancy of $c$. Willcox replies that Van der Pauw's least-squares method of fitting the parameters in the Mitscherlich equation for certain data on barley and rye results in an unrealistic representation of the facts (see below). c. Value of $c$. Willcox restates his original position that 0.122 is the correct value. He says that the value 0.2, recently adopted by Mitscherlich and Atanasiu as more suitable than 0.122, applies to cases in which there is some yield depression.

4. Yield response and nutrient absorption.—Willcox's statements do not have logical continuity, and hence do not constitute a satisfactory reply.

5. Recovery of added nitrogen.—No reply.


8. Experimental tests on the inverse yield-nitrogen law. Willcox introduces his own special statistical method, as evidenced by the last paragraph in column 2, page 321. His statement is equivalent to the following: "From here, by following recognized mathematical procedures, we derive a value which on conversion from metric to U. S. customary units, turns out to be 318 pounds of nitrogen usefully absorbed per acre of soil in one cycle of plant growth." The "recognized mathematical procedures" do not exist, in the authors. Although he elaborates on mass action and "allometry" as justification for his mathematical procedures, he neither gives the procedures nor explains precisely how the foregoing procedures thereto. The lack of this kind of information tells us that the authors' original criticisms were perhaps as familiar as Willcox's. Willcox states that "any mathematical expression for the crop 'is an incompletely reverted hybrid.' He states that within similar conditions of soil, crop, and environment, both yield of dry matter and yield of nitrogen are the recognized functions of the nitrogen supply in the soil, and hence of the crop. Willcox has in reality said no more than this, that does not agree with his ideas, Willcox supposes that he has coined this term for the purpose of "characterizing certain anomalous hybrid sugar cane clones that show evidence of genetic readjustment." By negating precisely what these terms signify, he has put forth an unverifiable hypothesis.


The foregoing tabulation shows that Willcox replied to most of the criticisms made by the authors. In reviewing the criticisms he has acknowledged, his reply seems satisfactory only in the case of the first.

Following are some brief comments on Willcox's reply:

1. To justify eliminating from consideration the question of the nitrogen constant 318, Willcox states that he has coined this term for the purpose of characterizing certain anomalous hybrid sugar cane clones that show evidence of genetic readjustment. By negating precisely what these terms signify, he has put forth an unverifiable hypothesis.