

ADVANCED SOIL FERTILITY

Agronomy 655

(Taught by Alfred M. Blackmer)

The content of Agronomy 655 focuses on the assumptions, concepts, and techniques used when evaluating soil fertility and estimating fertilizer needs. The objective is to involve advanced students in a critical review of the assumptions, concepts, and techniques that have been used. Economic, environmental, and social issues will be discussed. Approximate numbers of lectures are indicated in parentheses.

1) **Introduction** (1). - Soil fertility evaluation as a science.

2) **Modeling yield response to added nutrients** (4).

Liebig's ideas, Mitscherlich's ideas, Bray's ideas, other models, response surfaces.

3) **Economics of fertilization** (5).

"Economic optimum" rates of fertilization, substitution, optimal combinations of nutrients, bias introduced by models.

EXAM

4) **Soil testing** (5).

Bray's ideas, Mitscherlich b values, relative yields, Cate-Nelson two-population splits, multiple regression analyses, sufficiency levels, basic cation saturation ratios, correlation, calibration.

5) **Plant tissue testing** (4).

Macy's ideas and modern examples, time of sampling effects, selection of tissue to be sampled, sample handling, form of nutrient measured, Steenbjerg effects, interactions of nutrients, Dean a values, Fried and Dean A values, non-evasive testing.

EXAM

6) **DRIS** (3)

7) **Addressing variability** (5).

Estimating fertilizer needs amid uncertainty, conventional sampling patterns, grid sampling, yield monitoring, remote sensing, defining management zones, addressing temporal variability.

EXAM