(c) If, in the original publication of a name, two or more spellings are used, without compelling evidence as to which is in error, the spelling employed by the first subsequent writer is to be adopted.

(II) In subsequent publications variant spellings may occur either through intention or misadventure. For the purpose of this section emendations are defined as changes that are originally stated to be intentional, or are demonstrably so; errors are any changes that are not emendations, including those of doubtful status which cannot be demonstrated from the original publication to be emendations.

Subsequent variant spellings are:

(a) Emendations that are justified under Section I above (see Ia); or

(b) Emendations that are not justified under Section I above. Such emendations have status as separately validated names with their own date and author; they are junior objective synonyms of the name in its original form; they are available as replacement names; they preoccupy any later names of the same spellings; and their authors are those who proposed them as emendations. [See Opinions 34, 120, 125, and 148 (with supplementary note).]; or

(c) Errors, as defined above. These are correctable and are to be treated as if corrected wherever they occur. They have no separate status in nomenclature, do not preoccupy, are not available as replacement names, and never acquire validity by citation in synonymy. [See Opinion 29.]

Example. The generic name *Oxytelus* (Coleoptera) has been written erroneously as *Cxytelus, Otytelus, Orytelus, Oxitelus, Oxyletus, Oxyteles, Oxyteius, Oxytelius, Oxytellus, Oxeotelus, Oxytetus,* and *Oyxtelus.* These are all to be corrected and have no separate status.

Example. In 1833 Germar (*Rev. Entomol.*, 1, 175) published the name *Dictyophara* (Homoptera). Among the numerous variant spellings of this name that have occurred is the lapsus *Dictyonota* of de Seabra 1930 (*Arq. Secc. Biol. Par.*, 1, 347). This lapsus may have been caused by association with *Dictyonota* Curtis (Hemiptera), with which insect it could not have been confused. The error is to be corrected and has no separate status in nomenclature. Or,

(d) Omission or addition of diacritic marks or the substitution for them of standard letters. Wherever these occur, they are not to be treated either as errors or as emendations but as permissible variations. As in Article 19, elimination of diacritic marks is recommended. Or,

(e) Translation of a numerical prefix into an Arabic numeral, or conversely, writing out a number in Latin characters. These are permissible variations, and the two forms are in every way coordinate. Either form preoccupies the other as well.

Example. Sexmaculatus may be written *6-maculatus*; *16-punctatus* may be written *sedecempunctatus* or *sedecem-punctatus.*

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Why Some Crop Plants Yield More Than Others

Occasion for this note is a recent paper by Kiesselbach (*J. Amer. Soc. Agron.*, 1948, 40, 216–236), who shows that corn agrotypes with starchy endosperms are greatly superior in yielding ability to those with sweet endosperms. He finds an explanation therefor in a hypothesis to the effect that carbon accumulation by the plant is influenced inversely by a concentration of water-soluble polysaccharides within the vegetation organs; in varying degree these carbohydrates block the capacity for carbon accumulation and yield, the blocking being least in the starchy and greatest in the sweet types. Therefore, yield depends on the gene that determines whether the endosperm is to be starchy or sweet.

This hypothesis will not be disturbed here except to point out that there are differences in yielding abilities (quantities of plant life) in all the families of plants that have furnished agrotypes for man's use—Gramminae, Leguminae, Chenopodiae, etc. It is highly desirable that plant geneticists and plant breeders should have a universal indicator of quantity of plant life—one that would combine certainty with convenience.

TABLE 1

NITROGEN AND YIELDS OF SUGAR CANES

Variety of sugar cane	Lbs of dry substance/acre	% of N in dry substance	Lbs of N in the crop	Lbs of dry substance/lb of N
	I	II	III	IV
Newer varieties				
POJ 2878	66,284	0.285	189.0	350.8
POJ 2714	65,307	0.290	189.3	344.9
JOJ 36M	68,599	0.290	199.0	354.8
Averages of new group	66,730	0.288	192.0	350.1
Older varieties				
BH 10(12)	64,509	0.306	197.3	326.8
Cristalina	58,979	0.318	197.3	314.5
Bourbon	52,529	0.356	187.1	280.9
Averages of old group	58,672	0.327	190.8	307.4

Such a universal indicator is available and has been available for 20 years in the inverse yield-nitrogen law. This law, which pervades (so far as is yet known) the entire kingdom of plants that have roots in the soil, takes care of all cases, regardless of water-soluble or insoluble carbohydrates or other nonnitrogenous plant products. The inverse yield-nitrogen law is to the effect that the yields of all agrotypes, without any clearly proved exceptions to date, are inversely proportional to the percentage of nitrogen contained in their whole dry, aboveground substance. It is shown below how Kiesselbach's data conform to this law. But first, two classic examples from agrobiologic literature may be cited to show what is meant.

In a field test (José Carreras G. *Agronomia* (Lima), No. 15; cf. Willcox. *J. Amer. Soc. Agron.*, 1939, 31, 568) to compare 6 sugar-cane agrotypes, the data in Table 1 were obtained. Referring to Table 1, it may be pointed out that, beginning at the bottom of column I and proceeding up, the yields of dry substance increase from a low of 52,529 to a high of 68,599 lbs/acre, while in column II the percentage of nitrogen in the dry substance increases downward from 0.285 to 0.356%. From column III it is to be seen that the quantities of nitrogen removed by these agrotypes from the soil are substantially constant, notwithstanding the large differences in yield. (This constancy of nitrogen uptake is a highly interesting circumstance.)

TABLE 2

NITROGEN AND YIELDS OF SUGAR BEETS

Beet varieties	Yield of roots/acre	% of N in the beets	Lbs of N in the crop	Lbs of roots/lb of N
Wohanka ZR	33,690	0.172	57.74	583
Selecta	34,374	0.170	57.43	578
Unnamed	35,885	0.164	57.77	621
Zapotil	35,911	0.161	57.81	621
Dobrovice	37,035	0.153	56.66	653

The same picture is presented in Table 2, which reports (Pazler. *Z. Zuckerind. Czech. Republik*, 1932–33, 241) data of a comparison of 5 sugar-beet agrotypes. (The data in this case refer to the fresh beet roots.) Starting at the top of column I in Table 2 and going down, the yield increases from 33,690 to 37,035 lbs/acre, while in column II the nitrogen content decreases from 0.172 to 0.153%. From column III of this table the important observation is again made that the amounts of nitrogen removed from the soil by these agrotypes are substantially constant, regardless of the differences of yield.

TABLE 3

NITROGEN AND YIELDS OF CORN AGROTYPES

Kind of corn planted	Lbs of dry substance/acre	% of N in dry substance	Lbs of N in the crop	Lbs of dry substance/lb of N
Dent	6,702	1.470	67.99	98.5
Sweet	4,191	1.541	64.68	64.7
Sweet	3,810	1.583	63.16	60.3

Kiesselbach's work was on the effect of outcrossing corn agrotypes having starchy and sweet endosperms, respectively. His data, recalculated to conform with Tables 1 and 2 above, are shown in Table 3 (his Table 5).

The inverse yield-nitrogen law is here plainly in action, as it seems to be everywhere else in the world of agrotypes. Whether one agrotype will yield more than another when both are offered the same agrobiologically normal conditions can be settled by determining their respective nitrogen contents; the one with the least nitrogen percentage will yield the most, regardless of botanical taxonomic position and regardless of genes that may control secondary characters.

One of the results of the writer's studies on the inverse yield-nitrogen law is the observation (mentioned above) that when agrotypes are grown under the same conditions in the same healthy soil, they take up substantially the same quantities of nitrogen without regard to the yield of nonnitrogenous plant substance. There are some apparent but no real contradictions of this principle which will not be discussed here. The full effect of the principle is not directly evident from the three above tables, which relate to crops grown on soils that were less than perfertile in three widely separated localities—Peru, Czechoslovakia, and Nebraska. In the writer's works it is shown that in the limit—that is, when the limit imposed by the law of diminshing increments of yield is reached and the agrotypes are giving their perultimate yields on perfertile soils, they all take up the same *maximum* quantity of nitrogen, which has been determined to be of the order of 318 lbs from one acre.

That is to say, in the limit, and within a narrow range of uncertainty which cannot be discussed here, all agrotypes of whatever description have the same quantitatively and stoichiometrically identical nitrogenous base; yet, with the same endowment of nitrogen out of which to fabricate their protoplasm and their enzymes, they differ enormously in ability to yield nonnitrogenous substance. The agrobiologic explanation of this is discussed elsewhere (*Quantitative agrobiology*, in three parts; Pt. 1: *The power of plants for growth and yield* is nearly completed).

In the work referred to, the writer uses the inverse yield-nitrogen law to tabulate the principal food-producing agrotypes according to their limit yielding abilities on one acre in one growth cycle. At the bottom of this scale are leguminous agrotypes like a soybean, with an average nitrogen content of 2.34% and an ultimate capacity for producing 13,531 lbs of dry substance/acre. Presently at the top of the scale is the gramminous POJ 2878 with 0.285% of nitrogen and a limit capacity for producing 111,578 lbs of dry vegetable substance/acre. The latter agrotype has 8.2 times more catalytic energy for photosynthesis than the former. In view of such spreads of yield as are indicated by this range of nitrogen percentage, it appears somewhat singular that plant geneticists and plant breeders have for so long overlooked the precision of the inverse yield-nitrogen law as a guide in the great work of extending the productivity of crop plants.

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