3

Vegetable Classification

IMPORTANCE AND BASIS FOR CLASSIFICATION

A systematic method of grouping different plants is essential in identifying and cataloging the voluminous information gathered about the many different plants known. When properly classified, orderly and efficient use of this information can result.

Relatively few plants are used as vegetables; among the hundreds of thousands of plants known, only several hundred are used as vegetables. However, in order to manage information about these plants, some system of classification, preferably having universal applicability, is necessary. Many methods of classification can be developed, but the value of any system depends on its usefulness. The system needs to be easy to use, accessible to all, and stable.

CLASSIFICATION ACCORDING TO CLIMATE (TEMPERATURE)

Climatic classification may have been one of the earliest attempts to logically group plants. Through experience, plant response to growing temperatures were recognized, and different plants could then be grouped for optimum growing temperatures and placed into either a cool or warm season category. Cool season vegetables show a preference during most of their growth for mean growing temperatures between 10°C and 18°C. Some have frost and even freezing tolerance, and for most, the edible products are leaf, stem, or root tissues. Familiar examples are cabbage, lettuce, spinach, potato, and carrot. Warm season crops are those that exhibit a preference for mean temperatures within a range of 18–30°C during most of their growth and development. Warm season vegetables are intolerant of frost, and botanically, the edible portions usually are the fruit or fruit products. Examples are tomato, melons, and beans.

V. E. Rubatzky et al., *World Vegetables*

Classification with regard to growing temperature or seasonal periods has some useful generalities, but there are overlaps and some exceptions. Temperature classification has more usefulness in temperate-zone conditions, because in the tropics, the distinction between warm and cool season vegetables is less clear.

OTHER CLASSIFICATIONS

Vegetable crops can also be loosely grouped according to their postharvest and storage temperature characteristics (Appendix, Table D). Other observations would suggest separation into classes that emphasis different responses to soil acidity (pH), salinity, nutritional requirements, and drainage. Plant response to any of these conditions exhibit a range of variability. Plant rooting depth, seed germination, and day length responsiveness are other characteristics that are used to separate plants, but such classifications have limited usefulness.

Additional classifications that identify differences in edible plant parts (botanical organs) are also limiting. Likewise, crop use categorizes are also ambiguous because of the duplicity in how vegetables are prepared and used. Classification according to plant life span, such as annual, biennial, or perennial habit, or by preferred habitat, whether aquatic, xerophytic, or mesophytic, is insufficient to precisely identify different plants.

BOTANICAL CLASSIFICATION

It becomes evident that all of these classifications mentioned result in huge overlaps, and although they may have some general usefulness, they are inadequate for precise identification. The system that is most precise and useful is that of botanical classification.

Botanical classification is largely based on the variability among plants with reference to flower type, morphology, and sexual compatibility. The basic groupings most useful are family, genus, species, and cultivars. This classification system, best known as the Latin binomial, was published as *Species Plantarum* in 1753 by Linnaeus and tends to be the most exact, and it is most widely accepted internationally.

The Latin binomial botanical classification begins with the plant kingdom to which all plants belong. The classification continues as follows:

Division
- a. Algae and fungi (Thallophyta)
- b. Moses and liverworts (Bryophyta)
- c. Ferns (Pteridophyta)
- d. Seed plants (Spermatophyta)
  - Classes of seed plants
    - a. Cone-bearing (Gymnosperm)
    - b. Flowering (Angiosperm)
      - Subclass of flowering plants
        - a. Monocotyledon
        - b. Dicotyledon
          - Order
            - Family
              - Genus
                - Species
                  - Variety or Group (botanical)
                    - Cultivar (horticultural variety)
                      - Strain (horticultural)

An example of the above classification as applied to the cabbage cultivar Golden Acre YR (YR = yellows resistant) is

- Division: Spermatophyta
  - Class: Angiospermae
    - Subclass: Dicotyledonae
      - Order: Rhoeodales
        - Family: Brassicaceae (Cruciferae)
          - Genus: *Brassica*
            - Species: *oleracea* L.
              - Group: Capitata
                - Cultivar: Golden Acre
                  - Strain: Golden Acre YR

The complete Latin binomial name actually has a third element, that being the name, often abbreviated, of the individual who first described the species. The "L." following the species name indicates that C. Linnaeus (considered the father of the Latin binomial classification system) was the authority. For reasons of brevity, attached authorship for species mentioned in this publication are omitted except where the crop is discussed in detail.

Latin was chosen as the appropriate language, as it was widely used in scholarly circles. Additionally, Latin was a language unlikely to change, and therefore the identification and classification of the various

plants would be stable. An International Code of Botanical Nomenclature helps to assure stability and resolves disagreement concerning plant classification.

DEFINITIONS USED IN BOTANICAL CLASSIFICATION

Family is an assemblage of genera that closely or uniformly resemble one another in general appearance and technical characters.

Genus identifies a more or less closely related and definable group of plants that may include one or more species. The species in the genus are usually structurally or phylogenetically related.

Species a group of similar organisms capable of interbreeding and are, more or less, distinctly different in morphological or other characteristics, usually reproductive parts, from other species in the same genus.

Variety is a subdivision of a species consisting of a population with morphological characteristics distinct from other species forms and is given a Latin name according to the rules of the International Code of Botanical Nomenclature. Variety was and continues to be used erroneously when the correct term should be cultivar. **Forma** is a subdivision of a species, ranking after variety. It is the lowest rank and usually designates a trivial variation.

Group is a category of cultivated plants at the subspecies level that have the same botanical binomial but have one or more characteristics sufficiently different to merit a name that distinguishes them from another category. The term is used for horticultural convenience and has no botanical recognition. Thus, it can be seen that botanical variety and group are similar and, therefore, often interchanged.

Cultivar, sometimes known as "horticultural variety," is a term that denotes certain cultivated plants that are alike in most important aspects of growth but are clearly distinguishable from others by one or more definite characteristics. When reproduced, they retain their distinguishing characteristics.

Cultigen refers to a plant or grouping of plants known only in cultivation, without a determined nativity, presumably having originated in the presently known form under domestication. Cultigen is not synonymous with cultivar.

Other terms having similar meaning as cultivar are as follows: **Clone** identifies material derived from a single individual and maintained by

vegetative propagation. All members of the population are genetically identical and can be maintained essentially uniform with relatively little selection. **Line** refers to a uniform sexually reproduced population, usually self-pollinated, that is seed propagated and maintained to the desired standard of uniformity by selection. **Strain** is a term used to identify plants of a given cultivar that possess similar characteristics but differ in some minor feature or quality.

Appendix Table B lists the botanical name of many of the better known world vegetables.

USEFULNESS OF BOTANICAL CLASSIFICATION

For biologists, the binomial botanical classification permits the establishment of plant relationships and their origins and serves as a positive identification of plants, regardless of language. For horticulturists, it allows the identification and/or recognition of some general associations with regard to plant adaptation, cultivation, pest control, handling, storage, and usage.

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