

Resource Book

CrGC

Crucifer Genetics Cooperative

Dept. of Plant Pathology, 1630 Linden Dr., University of Wisconsin, Madison, WI 53706



The Crucifer Genetics Cooperative gratefully acknowledges the support provided in the preparation of this workbook by UW-Madison's College of Agricultural and Life Sciences, the Department of Plant Pathology, and the University-Industry Research Program. The special assistance of graphic artist Mary G. Jondrow, of UIR, is also appreciatively noted.

—Paul H. Williams

© 1985 by Crucifer Genetics Cooperative, Dept. of Plant Pathology,
University of Wisconsin-Madison, Madison, Wisconsin

CRUCIFER GENETICS COOPERATIVE

DEPT. OF PLANT PATHOLOGY, 1630 LINDEN DR., UNIVERSITY OF WISCONSIN, MADISON, WISCONSIN 53706 (608-262-6496)

GT 06-15-87 WILPAU

GENETIC TERMINOLOGY IN BRASSICA AND RAPHANUS

Genomic designators for each species or synthetic derivatives of nuclear cytoplasmic substitutions or cell fusions use the following convention.

Genomic Designations

Cytoplasmic genomes are designated by capital letters corresponding to the lower case nuclear genomic equivalents, (see CrGC - ID #, NG 05-11-85 WILPAU). Cytoplasm with a particular phenotype are designated by the appropriate capital letter plus a number for which there is a specific description and designation of origin.

e.g. *Brassica campestris* = Aaa

a = x = n = 10 chromosomes

A = unspecified *B. campestris* cytoplasm (A is usually omitted).

Rlaa = *B. campestris* nucleus substituted in R1 (CMS) cytoplasm from *Raphanus sativus*.

Genotypic Descriptors

Follow international convention. Genes are designated by a gene symbol (written in *script* or printed and underlined>) describing the particular phenotype (normally 1-3 letters are used) and either the initial letter is capitalized (dominant character) or not capitalized (recessive trait).

- the contrasting phenotype to the described gene is the "wild type" and is designated with a plus symbol (+).
- genotypes are distinguished from phenotypes for which the specific nature of the genetic control is not known by separating the genotypic descriptors for a trait with a slash(/).
- e.g. y = single recessive gene for yellow embryo
 - y/y = yellow embryo expressed
 - $y/+$ = yellow embryo heterozygous (not expressed)
 y is derived from the female gamete.
 - $+/y$ = yellow embryo heterozygous (not expressed)
 y is derived from the male gamete.
 - $y+$ = wild type for yellow embryo = green embryo = $+/+$

Acl = single dominant gene for resistance to *Albugo candida* race 2.

Acl/Acl = plant homozygous resistant

$Acl/+$ = plant resistant, heterozygous, Acl derived from female parent

Acl/- = plant resistant but it is not known whether
 Acl derived from female parent
 Acl+ = plant is susceptible to *A. candida* race
 2 = +/+

Phenotypic Descriptors

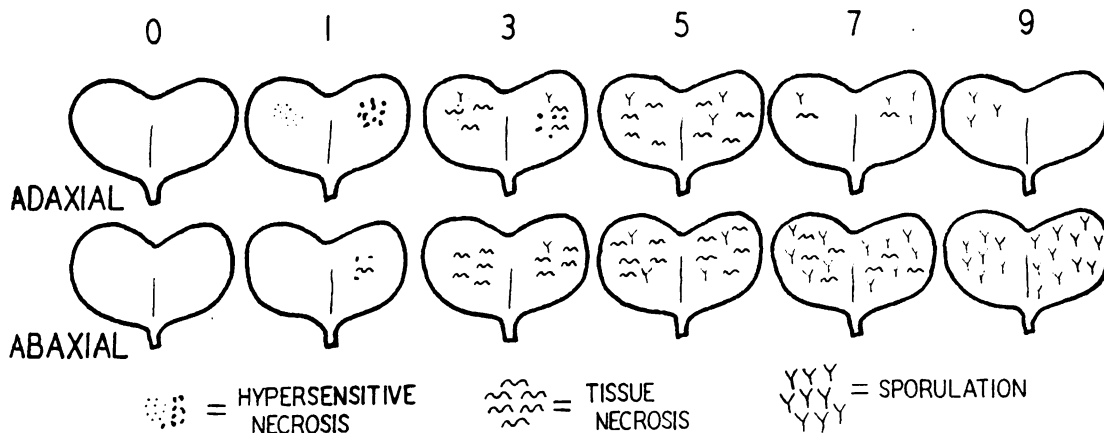
Symbols, which are printed in normal type (non italics) and are not underlined, are selected to describe the observed phenotype. Letters are written in either upper case or lower case depending on whether the trait is expected to be dominant or highly heritable. The choice of letters should be those which would likely be used to designate the genotype of the trait. If a trait shows variation in expressivity which is not easily quantified in measurable units, a quantifer on a 0-9 scale can be placed in brackets following the symbol.

Verbalization of expression of variable traits such as disease interaction phenotype may be given as follows:

- | | |
|-----------------------------|---|
| 0 = trait absent | 0 = trait immune |
| 1 = very low expression | 1 = very high resistance |
| 2 = low expression | 2 = high resistance |
| 3 = | 3 = resistant |
| 4 = | 4 = moderate resistance (weak susceptibility) |
| 5 = intermediate expression | 5 = intermediate resistance-susceptibility |
| 6 = | 6 = moderate susceptibility (weak resistance) |
| 7 = | 7 = susceptible |
| 8 = high expression | 8 = high susceptibility |
| 9 = very highly expressed | 9 = very high susceptibility |

Intermediate scaling e.g. 0, 1, 3, 5, 7, 9, or 2, 4, 6, 8, is permitted. Scaling is made more useful by accompanying visual (pictorial or graphic) descriptions of the variation in relation to the scale.

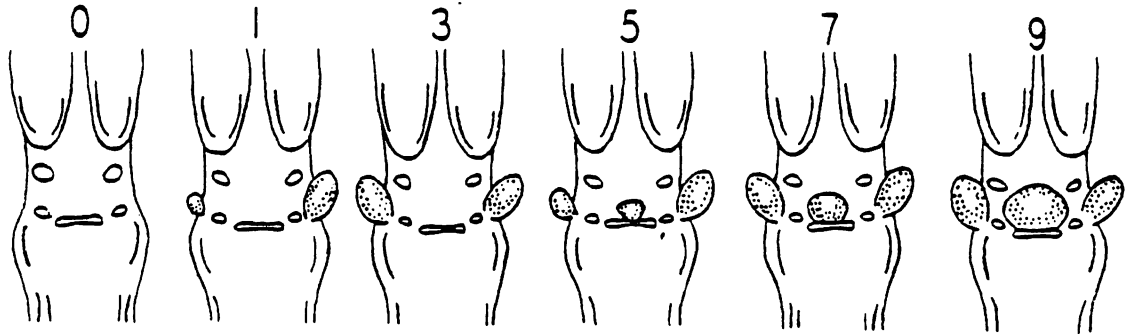
e.g. PP(7) = *Peronospora parasitica* is able to grow on the plant to a degree of 7 on a scale of 0-9 where 0 = no indication of disease and 9 = heavy growth of the parasite on the plant. (See CrGC - ID# DSPP 05-13-85 WILPAU)



e.g. Nectary morphological scale for the assessment of nectary functions in cms *Brassica campestris*.

Top: Diagram of flower base of *B. campestris* indicating the position of nectaries.

Bottom: 0 = no nectaries; 1 = one or two partially developed nectaries, usually small; 3 = two partially developed nectaries close to normal size; 5 = three partially developed nectaries, one usually smaller; 7 = four partially developed nectaries from small to nearly normal size; 9 = four fully developed nectaries.



Cytoplasmic Descriptors

Until a uniformly acceptable system for designating cytoplasmic phenotypes and genotypes is developed, it is suggested that specific cytoplasm be designated by the upper case letters corresponding to the nuclear genome of the species contributing the cytoplasm followed by a number which would be referred to a published description of the particular cytoplasmic phenotype or genotype.

e.g. Alaa = variegated cytoplasm from *B. campestris* (P.H. Williams)

- chimeral variegation throughout the plant ranging from faint mottling and flecking to large albino sectors or completely white (lethal) plants. The amount of variegation can be described on a semiquantitative scale of 0 - 9 representing the approximated percentage of the plant that is white or variegated. e.g. VG(5) = variegation of about 50%.
- maternally inherited, CrGC-19 stock.

e.g. Rlrr = CMS, cytoplasm in *R. sativus* (H. Ogura).

- 2 independent dominant restorers in rr genome *Rf1* & *Rf2*.
- some instability of expression related to environmental and genetic background.
- completely sterile and stable when *Brassica* nuclei are substituted in the R1 cytoplasm, Rlaa, Rlcc, Rlaacc.
- associated with chlorosis, especially of younger tissues and at cool temperatures (<12 C).

