

Purpose:

Apply the concepts of identity by descent to determine coefficients of inbreeding and parentage among breeding lines.

Keywords:

Coefficient of Parentage, Coefficient of Relationship, Coefficient of Inbreeding

References:

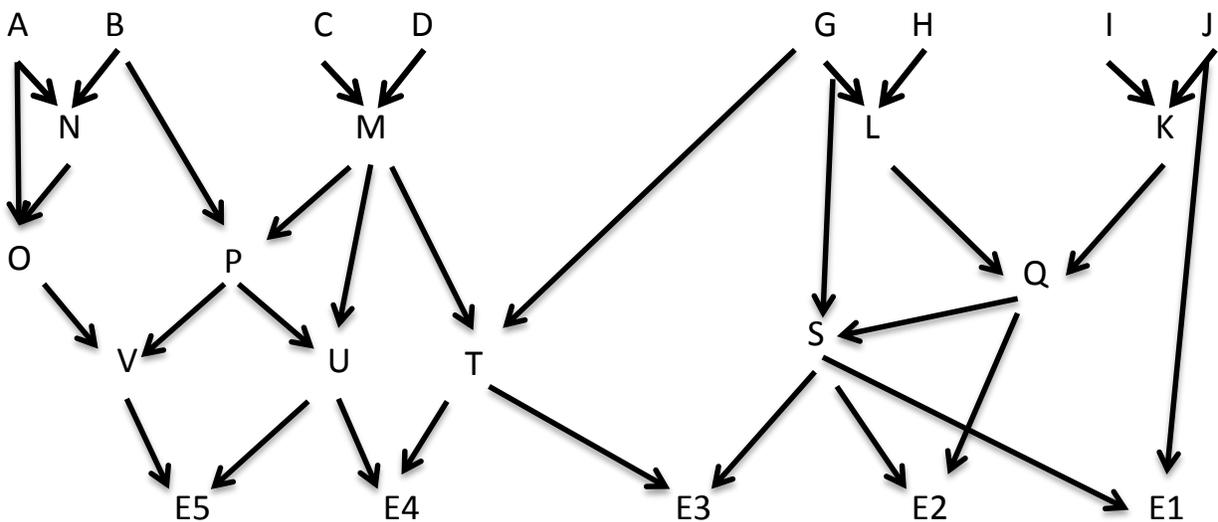
Captive: Relationship Coefficients,
Bernardo-Chapter 2

ALA:

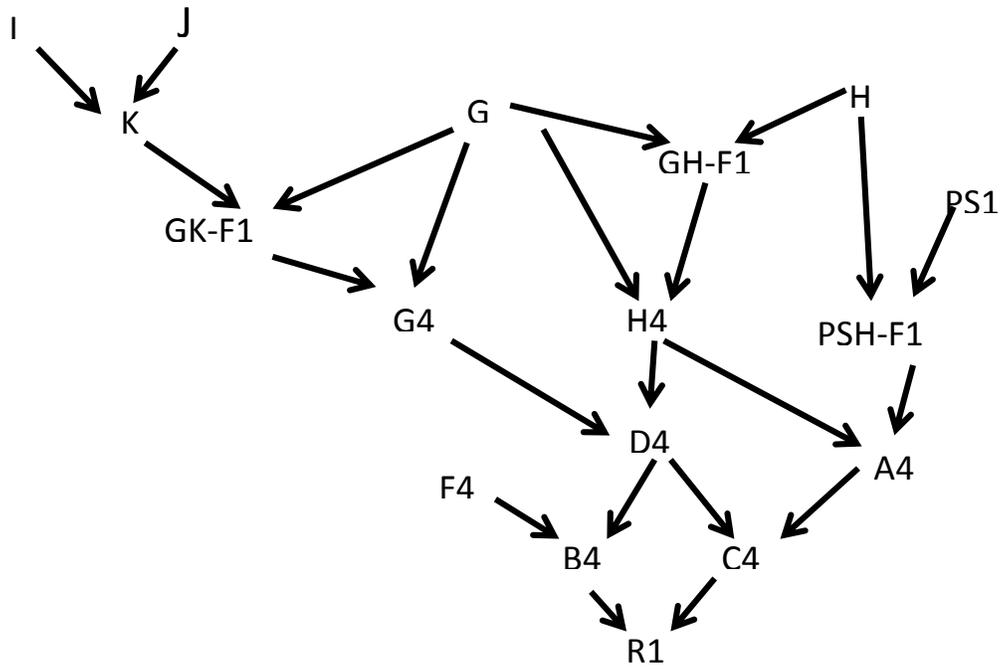
Consider the winter barley breeding program for craft brewing in the Southeastern US. To initiate this program the collaborative paid public breeders in North Carolina, Georgia and Mississippi to make a number of crosses involving their elite lines with acceptable malting characteristics (E1, E2, E3, E4, E5) and a widely grown winter variety (R1) that was grown for grain in animal feed.

Based on predicted values for malting and yield many of you suggested advancing lines L44, L21, L35, E4, L46, L44, L12, L35, L33, E5. Based on the parentage of these lines would you also advance these lines into a breeding nursery to make a next generation of malting barley lines? The pedigrees of the E lines, R and L lines are given below. For purposes of this exercise it is ok to assume lines were derived in the F3 generation, but have been advanced through bulks and roguing off-types to the F6 or later generation for the field trials that were used in IP1.

Pedigree of E lines:



Pedigree of R1



Parentage of L lines:

R1xE1

L15
L26
L36
L29

R1xE2

L1
L24
L27
L41

R1xE3

L11
L14
L17
L2

R1xE4

L7
L8
L9
L62
L64

R1xE5

L34
L37
L38

E1xE4

L28
L25
L18

E2xE3

L39
L4
L3
L30
L13
L22
L32

E3xE4

L5
L6
L16
L23
L31
L40

E3xE5

L48
L50
L52
L54
L10
L12

E4xE5

L20
L21
L33
L35
L42
L44
L46

Lines		E3-4	E4-4	E5-4	L12-4	L21-4	L33-4	L35-4	L44-4	L46-4
	#	V26	V30	V34	V44	V48	V52	V56	V60	V64
E3-4	26	1.947	0.422	0.125	1.036	0.273	0.273	0.273	0.273	0.273
E4-4	30	0.422	1.949	0.539	0.480	1.244	1.244	1.244	1.244	1.244
E5-4	34	0.125	0.539	1.950	1.038	1.245	1.245	1.245	1.245	1.245
L12-4	44	1.036	0.480	1.038	1.941	0.759	0.759	0.759	0.759	0.759
L21-4	48	0.273	1.244	1.245	0.759	1.954	1.244	1.244	1.244	1.244
L33-4	52	0.273	1.244	1.245	0.759	1.244	1.954	1.244	1.244	1.244
L35-4	56	0.273	1.244	1.245	0.759	1.244	1.244	1.954	1.244	1.244
L44-4	60	0.273	1.244	1.245	0.759	1.244	1.244	1.244	1.954	1.244
L46-4	64	0.273	1.244	1.245	0.759	1.244	1.244	1.244	1.244	1.954

	L44	L21	L46	L12	L35	L33
L44	1.3	0.89	0.89	0.58	0.89	0.89
L21	0.89	1.30	0.89	0.58	0.89	0.89
L46	0.89	0.89	1.30	0.58	0.89	0.89
L12	0.58	0.58	0.58	1.08	0.58	0.58
L35	0.89	0.89	0.89	0.58	1.30	0.89
L33	0.89	0.89	0.89	0.58	0.89	1.30