Wisconsin Fast Plants™

Seed Stock Profile

F_1 and F_2 Generations of

Non-Purple Stem

Single, recessive trait: *anl/anl*

The F_1 (hybrid) generation is produced by crossing Non-Purple Stem plants (*anl/anl*) with Purple Stem plants that are homozygous for the wild-type allele (*ANL/ANL*). The resulting F_1 progeny have purple stems. The F_1 genotype is heterozygous (*anl/ANL*). This illustrates the principle of *dominance*.

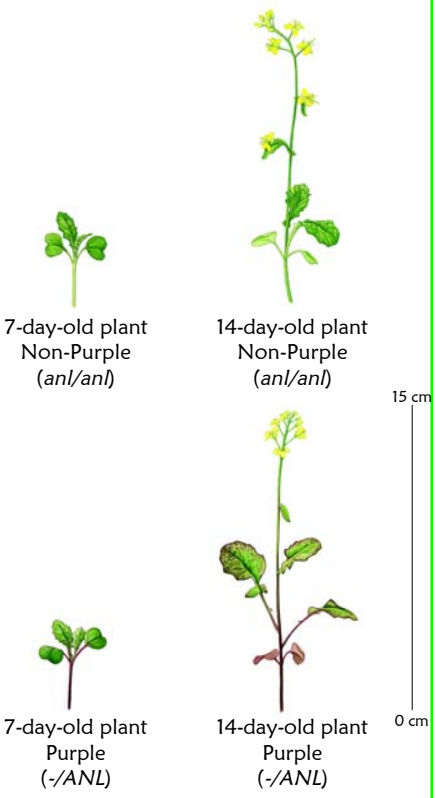
The F_2 generation is produced by intermating the F_1 population and harvesting the seeds. The plants in this generation segregate in a 3:1 ratio of Purple:Non-Purple. (See back page for details.) This illustrates the *Law of Segregation*.

Purple Stem plants produce anthocyanin, a purple pigment found in Standard Wisconsin Fast Plants™. The purple color is visible on the stems and hypocotyls, under cotyledons, and at the leaf tips and hydathodes. Their genotype is either *ANL/ANL* or *anl/ANL* (which is abbreviated *-/ANL*).

Non-Purple Stem plants do not produce anthocyanin. The lack of anthocyanin causes the plants to appear a brilliant green color. Their genotype is *anl/anl*.

This stock is designed for teaching Mendelian genetics with a monohybrid cross. (See back page for details.)

Length of life cycle: 35-45 days
Days to flowering: 14
Average plant height at day 14: 15 cm



7-day-old plant Non-Purple (*anl/anl*)

14-day-old plant Non-Purple (*anl/anl*)

7-day-old plant Purple (*-/ANL*)

14-day-old plant Purple (*-/ANL*)

Growing Tips

- 24-hour fluorescent light, water, and fertilizer are essential for Wisconsin Fast Plants™. Refer to *Growing Instructions* for more details.
- Prior experience growing WIsconsin Fast Plants™ is useful for comparing Non-Purple Stem and Purple Stem.
- The purple color is best observed on the hypocotyls (stems) when the plants are 4-7 days old.
- The amount of purple color is affected by the environment. A deeper purple color results from high light levels, low nutrient (fertilizer) levels, or petri-plate germination.

Mendelian Genetics with a Monohybrid Cross Using Wisconsin Fast Plants™

	P_1	x	P_2
Parent Generation			
Genotype	*anl/anl*		*ANL/ANL*
Phenotype	non-purple		purple

Cross P_1 x P_2 plants

	F_1
Hybrid (F_1) Generation	
Genotype	*anl/ANL*
Phenotype	purple

Intermate plants of the F_1 generation

F_2 Generation				
Genotypes	*anl/anl*	*anl/ANL*	*ANL/anl*	*ANL/ANL*
Phenotypes	non-purple	purple	purple	purple
	1	3		

Written by Wisconsin Fast Plants Program 2001. Layout by Sarah Lauffer. Color art by Alison Schroeer. Line art by Amy Kelley.

Tips for a Monohybrid Cross with the Anthocyaninless (*anl*) Gene

To ensure high seed yields, follow the *Growing Instructions* carefully. Expect an approximate 3:1 ratio of plants in the F_2 generation. Due to the random nature of gamete segregation, an exact 3:1 ratio is unlikely to be observed. Use the ratio as a foundation for understanding the Law of Segregation. Try graphing the data to see patterns, or do a χ^2 test to estimate the probability of the results. See *www.fastplants.org* for details about how to do this monohybrid investigation, or for information about the companion dihybrid investigation.