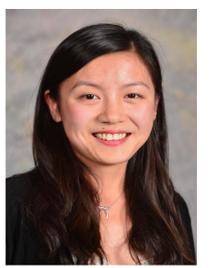




Progenies derived from Disomic Alien Addition Lines from an Intersubgeneric Cross between *Glycine max* and *G. tomentella*

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Introduction

Disomic alien addition lines (DAALs, 2n=42) were obtained from an intersubgeneric cross between *Glycine max* [L.] Merr. cv. Dwight (2n=40) and *G. tomentella* Hayata (PI441001, 2n=78). They are morphologically uniform but distinct from either of the parents. These DAALs were all derived from the same monosomic alien addition line (2n=41), and theoretically they should breed true because they have a pair of homologous chromosomes from *G. tomentella* and 40 soybean chromosomes. However, in some selfed progenies of DAALs the extra *G. tomentella* chromosomes were eliminated resulting in disomic progeny lines with 2n=40 chromosomes that had many phenotypic differences. The objectives of this research were to document the phenotypic variation among the progeny of these DAALs, and to understand the genetics behind these phenomena.

Picture of a DAAL (2n=42)



Increased yield and composition (mean of 2 locations in 2015)

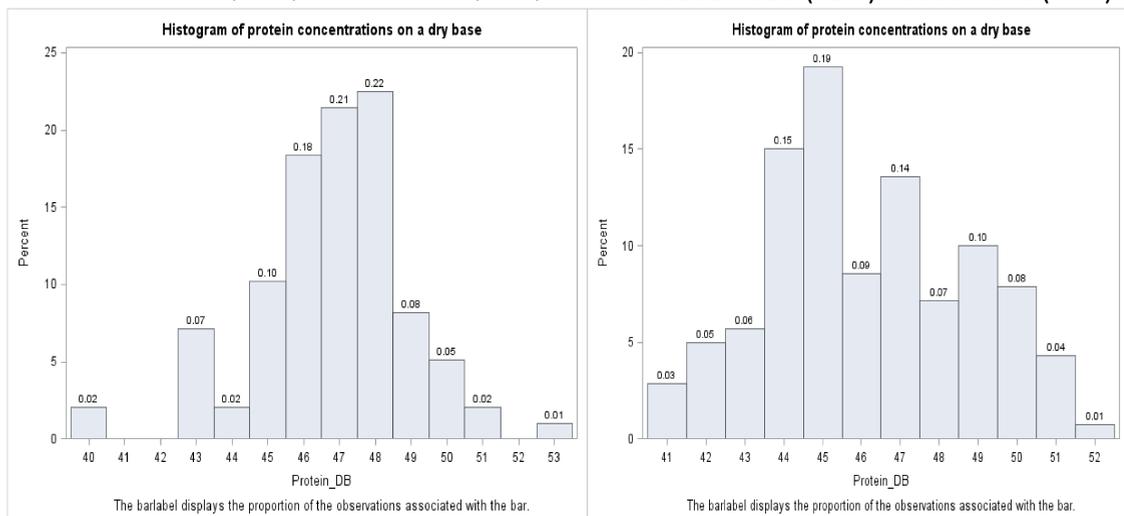
Entry	Yield (kg/ha)	Maturity	Oil Concentration (% DW)	Protein Concentration (% DW)
Dwight	3669	Sept 14	22.1	39.6
LG13-7332	4166	+10	24.8	42.3

High protein concentrations

Partial diallel crosses have been made among the three disomic progenies with protein concentrations of more than 45% for genetic studies.

F2 LG12-7063 (49%) x LG12-7086 (45%)

F2 LG12-7086 (45%) x LG12-7072 (47%)

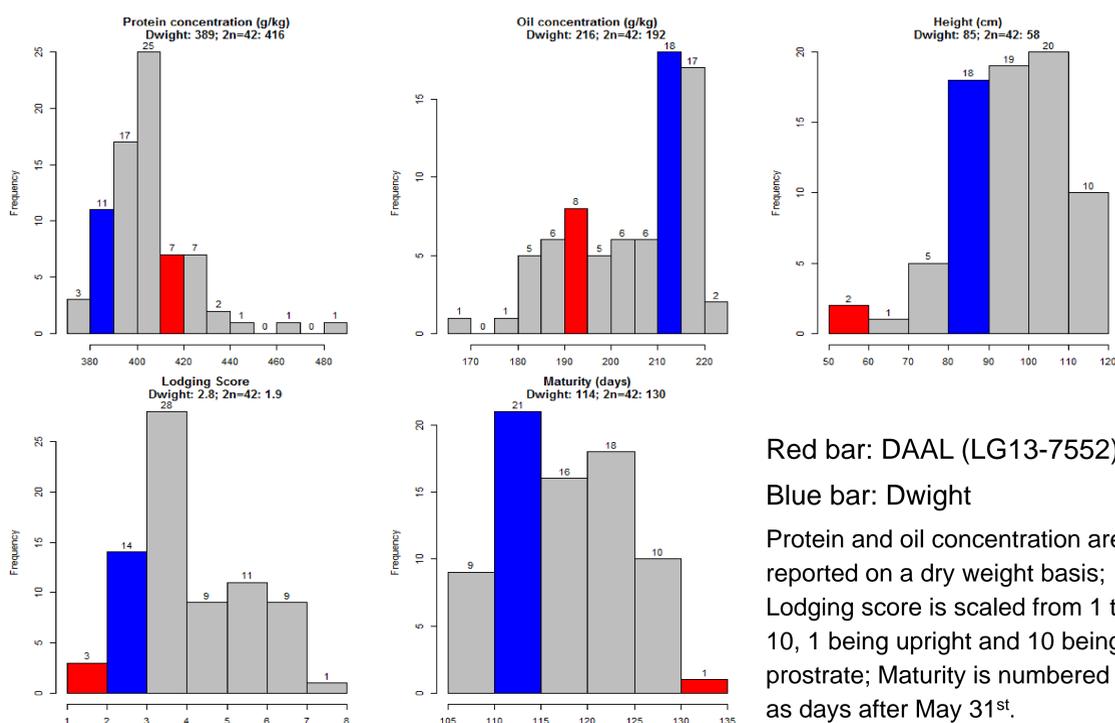


Qualitative traits of the derived progenies (2n=40)

Trait	Dwight	<i>G. tomentella</i> PI 441001	DAALs (2n=42)	Derived Disomic Progenies (2n=40)
Pubescence	Tawny	Tawny	Tawny	Tawny, Gray, Light tawny
Seed Coat Color	Yellow	Black	Yellow	Yellow, Black, Brown, Green, Buff
Hilum Color	Black	Black	Black	Gray, Yellow, Black, Imperfect black, Brown, Buff
Flower Color	Purple	Purple	Purple	Purple, White
Pod Color	Brown	Black	Brown	Brown, Tan, Black
Stem Termination	Ind.	Perennial	Ind.	Det., Ind.

Abbreviations: Ind.: Indeterminate; Det.: Determinate

Quantitative traits of the derived progenies (2n=40)



Red bar: DAAL (LG13-7552)

Blue bar: Dwight

Protein and oil concentration are reported on a dry weight basis; Lodging score is scaled from 1 to 10, 1 being upright and 10 being prostrate; Maturity is numbered as days after May 31st.

New allele identified at the *T* locus that controls pubescence color

A new deletion that has never been reported before.

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Harosoy      AAGCACCACAGAATGGGCCATTGCGGAAGTAAATAAAAAACCCACAAATTTTGGCCAAACT 1571
LG12-7063   AAGCACCACAGAATGGGCCATTGCGGAAGTAAATAAAAAACCCACA-ATTTTGGCCAAACT  92
Williams82  AAGCACCACAGAATGGGCCATTGCGGAAGTAAATAAAAAACCCACAAATTTTGGCCAAACT 1059
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Harosoy      TCTTCTGTGCCACGTGCTGCTGCCGAGAGTTGTGAGATATTTGGTACCACATCC-CAA 1750
LG12-7063   TCTTCTGTGCCACGTGCTGCTGCCGAGAGTTGTGAGATATTTGGTACCACATCCCCAA 272
Williams82  TCTTCTGTGCCACGTGCTGCTGCCGAGAGTTGTGAGATATTTGGTACCACATCCCCAA 1239
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Previously reported deletion.

Harosoy and LG12-7063 have gray pubescence, and Williams 82 has tawny pubescence.

Summary

- Wide phenotypic variation among the disomic progenies has been documented in this study.
- These progenies can be parents to breed for enhanced composition and yield and they provide evidence that the perennial relatives are useful resources in soybean breeding.
- Genetics behind this wide variation and the causes of the sequence changes are still under investigation.