

Supplemental Tables and Figures

Supplemental Table 1: Geographic origin, genotype class, genetic ancestry, and experiment.

Collection Location	Latitude	Longitude	Genotype Class	Proportion <i>A. syriaca</i> ancestry	Herbivore growth (2021)	Herbivore growth (2023)	Leaf Cardenolides Quantified (2023)	Monarch Cardenolides Quantified (2023)	Latex Exudation and Trichomes (2023)	Herbivore growth (2025)	Nutrient Analysis
Aladdin, WY	44.5541	-104.0069	<i>A. speciosa</i>	0.0	✓	✓	✓	✓		✓	✓
Boys Ranch, TX	35.5308	-102.2516	<i>A. speciosa</i>	0.0		✓	✓	✓	✓		✓
Dickinson, ND	46.8825	-102.8004	<i>A. speciosa</i>	0.0		✓	✓	✓	✓	✓	✓
Hamilton, MT	46.2260	-114.0954	<i>A. speciosa</i>	0.0		✓	✓	✓	✓		
Logan, UT	41.7390	-111.8390	<i>A. speciosa</i>	0.0		✓	✓	✓	✓	✓	✓
F1 Cross Makoce x Spearfish			<i>hybrid</i>	0.5		✓	✓	✓	✓	✓	✓
Glyndon, MN	46.8628	-96.4766	<i>hybrid</i>	0.5		✓	✓	✓	✓	✓	✓
Cherry County, NE	42.9618	-100.2575	<i>hybrid</i>	0.6		✓	✓	✓	✓	✓	✓
Buffalo River State Park, MN	46.8656	-96.4689	<i>hybrid</i>	0.8		✓	✓	✓	✓	✓	✓
Stickney, SD	43.5537	-98.4998	<i>hybrid</i>	0.9	✓	✓	✓	✓	✓		✓
Blue Mounds State Park, SD	43.7147	-96.1827	<i>A. syriaca</i>	0.9	✓	✓	✓	✓	✓	✓	✓
Cottleville, MO	38.7481	-90.6512	<i>A. syriaca</i>	1.0		✓	✓	✓	✓		✓

East Bend, NC	36.4954	-80.4955	<i>A. syriaca</i>	1.0	✓	✓	✓	✓	✓		✓
Lawrence, KS	39.1017	-95.2707	<i>A. syriaca</i>	1.0		✓	✓	✓	✓	✓	✓
Lincoln, NE	40.7805	-96.6280	<i>A. syriaca</i>	1.0		✓	✓	✓	✓	✓	✓
Mankato MN	44.2283	-93.9588	<i>A. syriaca</i>	1.0		✓	✓	✓	✓	✓	✓
Montgomery City, MO	38.9243	-91.5423	<i>A. syriaca</i>	1.0		✓	✓	✓	✓	✓	✓
Ada County, ID	43.5157	-116.3477	<i>A. speciosa</i>	0.0					✓		
Ellensburg, WA	46.9909	-120.5653	<i>A. speciosa</i>	0.0					✓		
Lola, MT	46.7276	-114.0796	<i>A. speciosa</i>	0.0	✓				✓		
Spearfish, SD	44.5506	-104.0097	<i>A. speciosa</i>	0.0	✓						
Taos, NM	36.7747	-105.6167	<i>A. speciosa</i>	0.0					✓		
Terry, MT	46.7854	-105.3021	<i>A. speciosa</i>	0.0	✓						
Sheriff Dam, SD	44.1081	-100.4237	<i>hybrid</i>	0.2	✓				✓		
Cross between unidentified hybrid families			<i>hybrid</i>	0.3					✓		
Pierre Grasslands, SD	44.1490	-100.4095	<i>hybrid</i>	0.5	✓						
F1 Cross Lake Park x Spearfish			<i>hybrid</i>	0.5					✓		

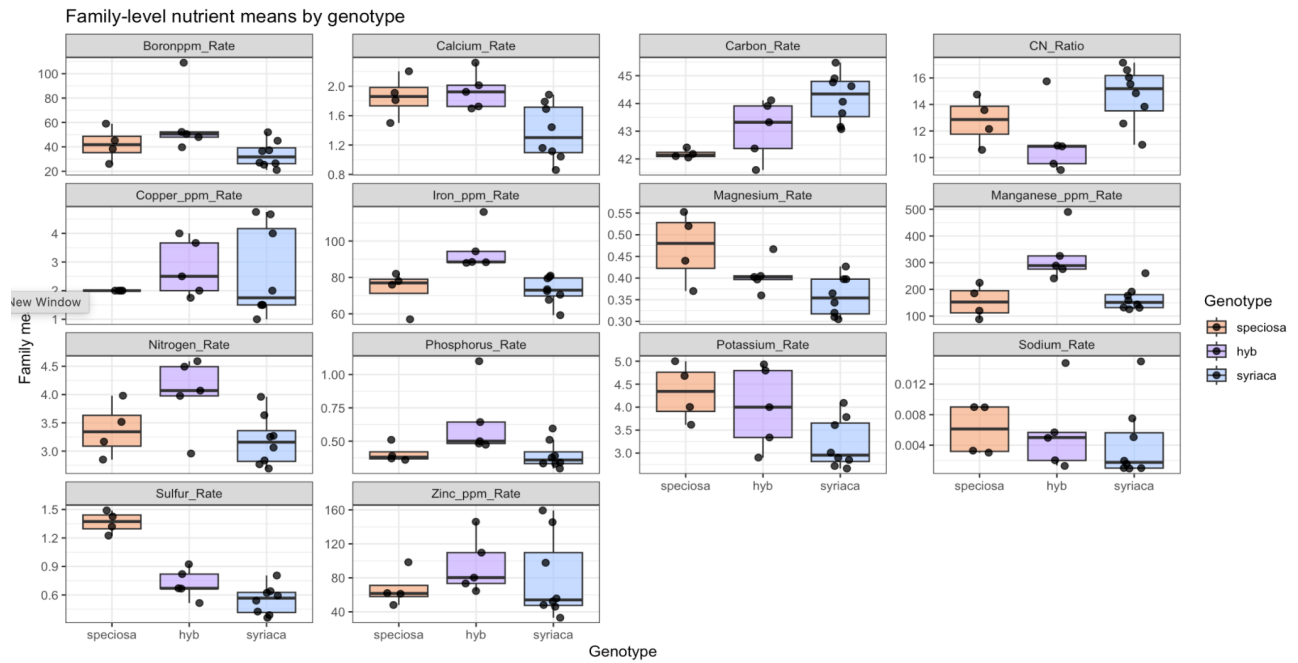
F1 Cross Makoce x Spearfish			<i>hybrid</i>	0.5					✓		
F1 Cross Spearfish x Makoce			<i>hybrid</i>	0.5					✓		
Sheriff Dam, SD	44.1183	-100.4238	<i>hybrid</i>	0.7					✓		
Spearfish, SD	44.4870	-103.8801	<i>hybrid</i>	0.7	✓						
Sheriff Dam, SD	44.1081	-100.4237	<i>hybrid</i>	0.8	✓						
Sheriff Dam, SD	44.1183	-100.4238	<i>hybrid</i>	0.8	✓						
Stickney, SD	43.5710	-98.4920	<i>hybrid</i>	0.9	✓						
Blue Mounds State Park, SD	43.6908	-96.1975	<i>A. syriaca</i>	1.0	✓						
Ames, IA	42.0650	-93.6336	<i>A. syriaca</i>	1.0					✓		
Burnett CO, WI	45.6898	-92.7312	<i>A. syriaca</i>	1.0					✓	✓	✓
Cleveland, OK	36.2174	-96.2625	<i>A. syriaca</i>	1.0					✓		
Downer's Grove, IL	41.7939	-88.0042	<i>A. syriaca</i>	1.0	✓				✓		
Ithaca, NY	42.4187	-76.5220	<i>A. syriaca</i>	1.0	✓						
Lake Park, MN	46.8627	-96.1773	<i>A. syriaca</i>	1.0	✓						
Sioux Falls, SD	43.5513	-96.9680	<i>A. syriaca</i>	1.0	✓						
Sheriff Dam, SD	44.1081	-100.4237	<i>A. speciosa</i>	1.0					✓		
South Amherst, OH	41.3141	-82.2732	<i>A. syriaca</i>	1.0	✓				✓		

Supplemental Table 2: Geographic origin, genetic ancestry, monarch performance, adult cardenolide sequestration, and manganese (Mn) concentration of plant families with nearly complete data

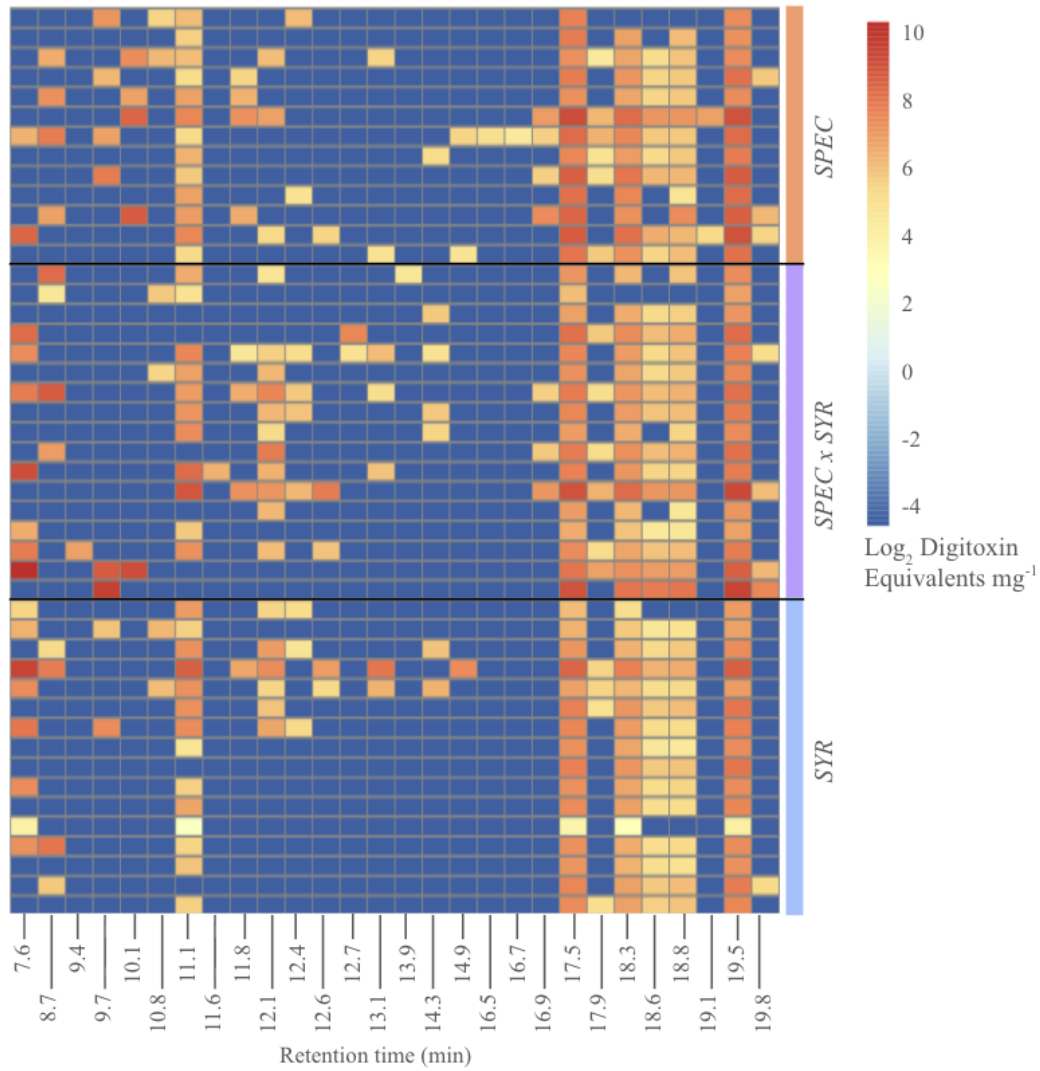
Collection Location	Latitude	Longitude	Genotype group	Proportion <i>A. syriaca</i> ancestry	Relative Growth 2023 / 2025	Cardenolide Concentration Adult Monarch Tissues (2023)	Mn (ppm)
Aladdin, WY	44.5541	-104.0069	<i>A. speciosa</i>	0.0	0.67 / 0.34	336.9	224.67
Boys Ranch, TX	35.5308	-102.2516	<i>A. speciosa</i>	0.0	0.85 / -	387.68	88.0
Dickinson, ND	46.8825	-102.8004	<i>A. speciosa</i>	0.0	1.0 / 0.7	546.56	120.0
Logan, UT	41.7390	-111.8390	<i>A. speciosa</i>	0.0	0.80 / 0.57	281.51	185.0
Blue Mounds State Park, SD	43.7147	-96.1827	<i>A. syriaca</i>	1.0	0.59 / -	146.44	176.5
Cottleville, MO	38.7481	-90.6512	<i>A. syriaca</i>	1.0	0.48 / -	201.25	131.0
East Bend, NC	36.4954	-80.4955	<i>A. syriaca</i>	1.0	0.98 / -	413.87	132.0
Lawrence, KS	39.1017	-95.2707	<i>A. syriaca</i>	1.0	0.82 / 0.29	203.32	158.8
Lincoln, NE	40.7805	-96.6280	<i>A. syriaca</i>	1.0	0.58 / 0.49	x	125.5
Mankato, MN	44.2283	-93.9588	<i>A. syriaca</i>	1.0	1.0 / 0.54	288.49	260.5
Montgomery City, MO	38.9243	-91.5423	<i>A. syriaca</i>	1.0	0.85 / 1.0	62.69	143.5
Buffalo River State Park, MN	46.8656	-96.4689	hybrid	0.8	0.44 / 0.22	x	325.3
Cherry County, NE	42.9618	-100.2575	hybrid	0.6	0.29 / 0.05	32.49	289.0
F1 Cross Makoce x Spearfish	na	na	hybrid	0.5	0.45 / 0.43	88.4	241.0
Glyndon, MN	46.8628	-96.4766	hybrid	0.5	0.43 / 0.39	84.13	490.0
Stickney, SD	43.5537	-98.4998	hybrid	0.9	0.78 / -	223.7	276.0

For each family, we report collection location as the nearest city or State Park, latitude and longitude, genotype group, estimated proportion *A. syriaca* ancestry, monarch relative growth in 2023 and 2025, adult tissue cardenolide concentration measured in 2023, and plant manganese concentration. Relative growth is reported for the 2023 and 2025 experiments; "-" indicates that the family was not included in that experiment. In the cardenolide concentration column, "x" indicates that the caterpillar died before adult cardenolide concentration could be measured

Supplemental Figures



Supplemental Figure 1: Plant nutrient content of *Asclepias speciosa* (orange), hybrids (purple) and *A. syriaca* (blue). Manganese, iron, and sulfur differ significantly among genotype groups after correction for multiple testing.



Supplemental Figure 2: Heatmap of individual leaf cardenolides concentrations plotted by retention time in minutes. Colors indicate log₂ digitoxin equivalents per mg dried leaf tissue. Genotype groups (*Asclepias speciosa*, *SPEC* (orange), hybrids, *SPEC* x *SYR* (purple) and *A. syriaca*, *SYR* (blue)) are indicated with labels and colored lines.