

Seed A Legacy Program

Minnesota Monarch Butterfly Mix

Spring 2021

Species	Scientific Name	Suggested Seeding Rates	PLS lbs per acre	PLS seeds per sq ft	% of Mixture PLS	Bloom Period	Pollinator Value
Big Bluestem, VNS	<i>Andropogon gerardii</i>	--	0.400	1.32	3.66%	--	--
Canada Wildrye	<i>Elymus canadensis</i>	--	0.500	1.31	3.62%	--	--
Little Bluestem, VNS	<i>Schizachyrium scoparium</i>	--	0.300	1.66	4.59%	--	--
Plains Oval Sedge	<i>Carex brevior</i>	0.01 - 0.05	0.060	0.89	2.47%	--	--
Prairie Junegrass	<i>Koeleria pyramidata</i>	--	0.020	1.06	2.94%	--	--
Sideoats Grama, Native Source	<i>Bouteloua curtipendula</i>	--	0.300	1.10	3.03%	--	--
Western Wheatgrass, Barton	<i>Elymus smithii</i>	--	0.300	0.78	2.17%	--	--
Anise Hyssop	<i>Agastache foeniculum</i>	0.003 - 0.015	0.025	0.83	2.29%	3	5
Aromatic Aster	<i>Aster oblongifolius</i>	0.001 - 0.01	0.010	1.18	3.28%	3	5
Blackeyed Susan	<i>Rudbeckia hirta</i>	0.01 - 0.1	0.030	1.09	3.00%	2	1
Blanketflower - G. aristata	<i>Gaillardia aristata</i>	0.04 - 0.2	0.200	0.86	2.37%	1	4
Blue Vervain	<i>Verbena hastata</i>	0.008 - 0.03	0.030	1.04	2.86%	2	5
Butterfly Milkweed	<i>Asclepias tuberosa</i>	0.01 - 0.04	0.010	0.02	0.04%	2	5
Canada Milkvetch	<i>Astragalus canadensis</i>	0.02 - 0.15	0.060	0.37	1.03%	2	4
Canada Tick-trefoil	<i>Desmodium canadense</i>	0.01 - 0.03	0.080	0.16	0.45%	2	5
Clasping Coneflower	<i>Rudbeckia amplexicaulis</i> or <i>Dracopis amplexicaulis</i>	0.01 - 0.05	0.030	1.10	3.05%	1	2
Common Evening Primrose	<i>Oenothera biennis</i>	0.005 - 0.04	0.030	0.95	2.62%	2	4
Common Milkweed	<i>Asclepias syriaca</i>	0.03 - 0.08	0.050	0.09	0.26%	2	5
Compass Plant	<i>Silphium laciniatum</i>	0.01 - 0.05	0.020	0.00	0.01%	2	5
Cup Plant	<i>Silphium perfoliatum</i>	0.01 - 0.05	0.040	0.06	0.16%	2	5
Deer Vetch, Native Source	<i>Acmispon americanus</i> or <i>Lotus unifoliolatus</i>	0.01 - 0.04	0.040	0.06	0.18%	3	4
Entire-leaved Rosinweed, Native Source	<i>Silphium integrifolium</i>	0.01 - 0.04	0.040	0.03	0.09%	2	5
False Boneset	<i>Brickellia eupatorioides</i>	0.005 - 0.01	0.030	0.36	1.00%	3	3
False or Oxeye Sunflower	<i>Heliopsis helianthoides</i>	0.03 - 0.09	0.200	0.48	1.32%	2	5
Foxglove Beardstongue	<i>Penstemon digitalis</i>	0.01 - 0.03	0.030	0.28	0.76%	1	5
Golden Alexander	<i>Zizia aurea</i>	0.02 - 0.04	0.090	0.36	1.01%	1	5
Gray Goldenrod	<i>Solidago nemoralis</i>	0.001 - 0.005	0.008	0.19	0.51%	3	4
Grayhead Coneflower	<i>Ratibida pinnata</i>	0.01 - 0.1	0.060	0.59	1.63%	2	4
Heath Aster	<i>Symphotrichum ericoides</i>	0.001 - 0.004	0.008	0.93	2.56%	3	5
Hoary Vervain	<i>Verbena stricta</i>	0.01 - 0.06	0.050	0.67	1.86%	2	5
Illinois Bundleflower	<i>Desmanthus illinoensis</i>	0.05 - 0.25	0.350	0.68	1.89%	2	5
Ironweed	<i>Vernonia fasciculata</i>	0.02 - 0.06	0.030	0.26	0.73%	2	5
Late or Giant Goldenrod, Native Source	<i>Solidago gigantea</i>	0.001 - 0.005	0.006	1.04	2.88%	3	5
Maximillian Sunflower	<i>Helianthus maximiliani</i>	0.01 - 0.05	0.080	0.36	1.00%	3	5
Missouri Goldenrod	<i>Solidago missouriensis</i>	0.001 - 0.007	0.006	0.87	2.41%	2	5
New England Aster	<i>Symphotrichum novae-angliae</i>	0.005 - 0.01	0.020	0.48	1.34%	3	5
Plains Coreopsis	<i>Coreopsis tinctoria</i>	0.01 - 0.05	0.020	1.48	4.09%	2	2
Plains Sunflower	<i>Helianthus petiolaris</i>	0.01 - 0.05	0.040	0.10	0.29%	3	5
Prairie Cinquefoil	<i>Dryocallis arguta</i>	0.003 - 0.008	0.009	0.91	2.52%	2	3
Purple Coneflower	<i>Echinacea purpurea</i>	0.05 - 0.2	0.300	0.80	2.20%	2	5
Purple Prairieclover	<i>Dalea purpurea</i>	0.04 - 0.15	0.200	1.46	4.03%	2	5
Rough Gayfeather	<i>Liatris aspera</i>	0.01 - 0.03	0.025	0.16	0.44%	3	5
Roundhead Lespedeza	<i>Lespedeza capitata</i>	0.02 - 0.05	0.060	0.24	0.66%	3	4
Sawtooth Sunflower	<i>Helianthus grosseserratus</i>	0.005 - 0.04	0.010	0.14	0.40%	3	5
Shell-leaf Penstemon	<i>Penstemon grandiflorus</i>	0.01 - 0.04	0.030	0.15	0.41%	1	5
Showy Partridgepea	<i>Chamaecrista fasciculata</i>	0.1 - 0.4	0.300	0.45	1.24%	2	5
Showy-wand Goldenrod	<i>Solidago speciosa</i>	0.001 - 0.008	0.009	0.88	2.45%	3	5
Skyblue Aster	<i>Symphotrichum oolentangiense</i>	0.003 - 0.006	0.010	0.29	0.81%	3	5
Smooth Blue Aster	<i>Symphotrichum laeve</i>	0.005 - 0.02	0.025	0.58	1.61%	3	5
Stiff Goldenrod	<i>Solidago rigida</i>	0.01 - 0.02	0.030	0.46	1.28%	3	5
Stiff Sunflower	<i>Helianthus pauciflorus</i>	0.01 - 0.04	0.030	0.51	1.41%	2	4
Swamp Milkweed	<i>Asclepias incarnata</i>	0.01 - 0.03	0.028	0.10	0.27%	2	5
Tall Boneset	<i>Eupatorium altissimum</i>	0.006 - 0.025	0.020	0.37	1.02%	3	4
Thickspike Gayfeather	<i>Liatris pycnostachya</i>	0.01 - 0.05	0.030	0.08	0.23%	3	5
Upright Coneflower	<i>Ratibida columnifera</i>	0.02 - 0.08	0.050	0.85	2.34%	2	2
Western Yarrow	<i>Achillea millefolium</i>	0.01 - 0.05	0.018	1.18	3.26%	1	2
White Prairieclover	<i>Dalea candida</i>	0.05 - 0.2	0.080	0.56	1.54%	2	5
Wild Bergamot	<i>Monarda fistulosa</i>	0.01 - 0.03	0.030	0.88	2.42%	2	5

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Rice Hulls - Filler for low planting rate mixtures		--	3.000	0.00	0.00%	--	--
Grasses Total:			1.880	8.127	22.48%		
Wildflower/Forb/Legume Total:			3.017	28.020	77.52%		
Filler Total:			3.000	0.000	0.00%		
Total Mixture:			7.897	36.147	100.00%		

Bloom Period	Wildflowers Used in Mixture	% PLS Seeding Rate of Mix
1 = April to May	6	10.85%
2 = June to July	26	42.44%
3 = August to October	19	24.22%
Total :	51	

 4.43 Pollinator Value

The Pollinator Value Score is determined based on a combination of factors that include:

- The pollen and/or nectar value of the plant species.
- Bee Integrated Program research results of pollinator pollen analysis
- Unique pollinator biological life histories of the plant species.
- The ability of the plant species to establish and persist in pollinator seeding mixtures.
- The total bloom period length of the plant species.
- The occurrence in early bloom periods (Bloom Period 1) that are hard to challenging to provide resources for.
- The commercial availability of the species for use in seeding mixtures.
- Value of the plant species pollen and nectar to commercial beekeepers.
- USGS Pollinator Library tool: <https://www.npwrc.usgs.gov/pollinator/home>
- The Ecoregional Revegetation Application tool: <http://www.nativevegetation.org/era/>
- Botanical and beekeeping reference materials that list the pollinator value of species.
- Field observations of floral resource use by pollinator species.