

Seed A Legacy Program

Missouri Monarch Butterfly Mix

Spring 2020

Species	Scientific Name	Suggested Seeding Rates	PLS lbs per acre	PLS seeds per sq ft	% of Mixture PLS	COC	Bloom Period	Pollinator Value
Big Bluestem, VNS	<i>Andropogon gerardii</i>	--	0.200	0.66	1.87%	5	--	--
Canada Wildrye	<i>Elymus canadensis</i>	--	0.300	0.79	2.22%	5	--	--
Little Bluestem, VNS	<i>Schizachyrium scoparium</i>	--	0.250	1.38	3.91%	4	--	--
Plains Oval Sedge	<i>Carex brevior</i>	0.01 - 0.05	0.020	0.30	0.84%	3	--	--
Prairie Junegrass	<i>Koeleria pyramidata</i>	--	0.050	2.66	7.52%	6	--	--
Rough or Tall Dropseed	<i>Sporobolus clandestinus</i>	--	0.100	1.10	3.12%	3	--	--
Schweinitz's Flatsedge, native source	<i>Cyperus schweinitzii</i>	--	0.010	0.11	0.30%	4	--	--
Sideoats Grama, Native Source	<i>Bouteloua curtipendula</i>	--	0.300	1.10	3.10%	5	--	--
Western Wheatgrass, Barton	<i>Elymus smithii</i>	--	0.400	1.05	2.96%	3	--	--
Alumroot	<i>Heuchera richardsonii</i>	0.001 - 0.005	0.003	0.76	2.14%	8	1	2
Annual or Common Sunflower, Native Source	<i>Helianthus annuus</i>	0.08 - 0.2	0.100	0.11	0.30%	--	3	5
Ashy Sunflower, Native Source	<i>Helianthus mollis</i>	0.01 - 0.04	0.021	0.10	0.28%	--	3	5
Baldwin's Ironweed, Native Source	<i>Vernonia baldwinii</i>	0.008 - 0.03	0.015	0.24	0.68%	3	2	5
Blackeyed Susan	<i>Rudbeckia hirta</i>	0.01 - 0.1	0.025	0.90	2.56%	3	2	1
Blue Vervain, Native Source	<i>Verbena hastata</i>	0.008 - 0.03	0.028	0.97	2.73%	4	2	5
Canada Goldenrod, Native Source	<i>Solidago canadensis</i>	0.001 - 0.005	0.002	0.33	0.92%	2	2	5
Canada Milkvetch	<i>Astragalus canadensis</i>	0.02 - 0.15	0.060	0.37	1.05%	5	2	4
Canada Tick-trefoil	<i>Desmodium canadense</i>	0.01 - 0.03	0.040	0.08	0.23%	5	2	5
Clasping Coneflower	<i>Rudbeckia amplexicaulis</i> or <i>Dracopis amplexicaulis</i>	0.01 - 0.05	0.070	2.57	7.27%		1	2
Common Evening Primrose, Native Source	<i>Oenothera biennis</i>	0.005 - 0.04	0.033	1.04	2.95%	1	2	4
Common Milkweed, Nebraska Native	<i>Asclepias syriaca</i>	0.03 - 0.08	0.060	0.11	0.32%	1	2	5
Culver's Root	<i>Veronicastrum virginicum</i>	0.001 - 0.004	0.003	0.83	2.34%	9	3	4
Cup Plant, Native Source	<i>Silphium perfoliatum</i>	0.01 - 0.05	0.040	0.06	0.17%	4	2	5
Deer Vetch, Native Source	<i>Acmispion americanus</i> or <i>Lotus unifoliolatus</i>	0.01 - 0.04	0.025	0.04	0.11%	3	3	4
False Boneset, Native Source	<i>Brickellia eupatorioides</i>	0.005 - 0.01	0.008	0.10	0.27%	3	3	3
False or Oxeye Sunflower	<i>Heliopsis helianthoides</i>	0.03 - 0.09	0.120	0.29	0.81%	4	2	5
Foxglove Beardstongue, Native Source	<i>Penstemon digitalis</i>	0.01 - 0.03	0.020	0.18	0.52%	6	1	5
Golden Alexander	<i>Zizia aurea</i>	0.02 - 0.04	0.085	0.34	0.97%	6	1	5
Gray Goldenrod	<i>Solidago nemoralis</i>	0.001 - 0.005	0.005	0.12	0.33%	--	3	4
Grayhead Coneflower	<i>Ratibida pinnata</i>	0.01 - 0.1	0.040	0.39	1.11%	3	2	4
Heath Aster	<i>Symphotrichum ericoides</i>	0.001 - 0.004	0.005	0.58	1.64%	3	3	5
Hoary Vervain, Native Source	<i>Verbena stricta</i>	0.01 - 0.06	0.035	0.47	1.33%	8	2	5
Illinois Bundleflower	<i>Desmanthus illinoensis</i>	0.05 - 0.25	0.400	0.78	2.21%	5	2	5
Ironweed, Native Source	<i>Vernonia fasciculata</i>	0.02 - 0.06	0.020	0.18	0.50%	4	2	5
Lanceleaf Coreopsis	<i>Coreopsis lanceolata</i>	0.05 - 0.1	0.200	1.01	2.87%	--	2	4
Late or Giant Goldenrod, Native Source	<i>Solidago gigantea</i>	0.001 - 0.005	0.006	1.04	2.95%	3	3	5
Lemon Mint or Lemon Bee Balm	<i>Monarda citriodora</i>	0.02 - 0.05	0.030	0.99	2.81%	--	2	3
Maximilian Sunflower	<i>Helianthus maximiliani</i>	0.01 - 0.05	0.040	0.18	0.51%	4	3	5
Missouri Goldenrod, Native Source	<i>Solidago missouriensis</i>	0.001 - 0.007	0.005	0.72	2.05%	5	2	5
New England Aster	<i>Symphotrichum novae-angliae</i>	0.005 - 0.01	0.010	0.24	0.69%	4	3	5
Plains Coreopsis	<i>Coreopsis tinctoria</i>	0.01 - 0.05	0.014	1.04	2.93%	1	2	2
Plains Sunflower, Native Source	<i>Helianthus petiolaris</i>	0.01 - 0.05	0.015	0.04	0.11%	2	3	5
Prairie Aster	<i>Symphotrichum falcatum</i>	0.015 - 0.05	0.030	0.28	0.80%	--	3	5
Purple Coneflower	<i>Echinacea purpurea</i>	0.05 - 0.2	0.150	0.40	1.13%	--	2	5
Purple Prairieclover	<i>Dalea purpurea</i>	0.04 - 0.15	0.100	0.73	2.06%	6	2	5
Rough Gayfeather	<i>Liatris aspera</i>	0.01 - 0.03	0.010	0.06	0.18%	5	3	5
Roundhead Lespedeza	<i>Lespedeza capitata</i>	0.02 - 0.05	0.032	0.13	0.36%	5	3	4
Sawtooth Sunflower	<i>Helianthus grosseserratus</i>	0.005 - 0.04	0.010	0.14	0.41%	4	3	5
Sensitive Briar, Native Source	<i>Mimosa nuttallii</i>	0.01 - 0.04	0.010	0.01	0.03%	6	2	3
Shell-leaf Penstemon, Native Source	<i>Penstemon grandiflorus</i>	0.01 - 0.04	0.020	0.10	0.28%	5	1	5
Showy Partridgepea	<i>Chamaecrista fasciculata</i>	0.1 - 0.4	0.300	0.45	1.27%	1	2	5
Showy-wand Goldenrod	<i>Solidago speciosa</i>	0.001 - 0.008	0.008	0.79	2.22%	7	3	5
Smooth Blue Aster	<i>Symphotrichum laeve</i>	0.005 - 0.02	0.020	0.47	1.32%	5	3	5
Stiff Goldenrod, Native Source	<i>Solidago rigida</i>	0.01 - 0.02	0.015	0.23	0.66%	3	3	5
Stiff Sunflower, Native Source	<i>Helianthus pauciflorus</i>	0.01 - 0.04	0.020	0.34	0.96%	5	2	4
Sullivan's Milkweed, Native Source	<i>Asclepias sullivantii</i>	0.01 - 0.05	0.010	0.02	0.05%	7	2	5
Sweet Blackeyed Susan	<i>Rudbeckia subtomentosa</i>	0.01 - 0.03	0.025	0.42	1.19%	4	2	2
Tall Boneset, Native Source	<i>Eupatorium altissimum</i>	0.006 - 0.025	0.010	0.18	0.52%	3	3	4
Tall Cinquefoil, Native Source	<i>Drymocallis arguta</i>	0.003 - 0.008	0.006	0.51	1.44%	6	2	4
Tall Coreopsis	<i>Coreopsis tripteris</i>	0.004 - 0.01	0.015	0.57	1.61%	4	2	3
Western Yarrow	<i>Achillea millefolium</i>	0.01 - 0.05	0.025	1.64	4.63%	2	1	2
White Prairieclover, Native Source	<i>Dalea candida</i>	0.04 - 0.1	0.050	0.35	0.99%	6	2	5
White Vervain, Native Source	<i>Verbena urticifolia</i>	0.002 - 0.004	0.010	0.25	0.72%	3	2	4
Wild Bergamot	<i>Monarda fistulosa</i>	0.01 - 0.03	0.030	0.88	2.48%	3	2	5

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Wild Quinine	<i>Parthenium integrifolium</i>	0.01 - 0.08	0.020	0.05	0.15%	9	2	2
Willow-leaf Sunflower, Native Source	<i>Helianthus salicifolius</i>	0.01 - 0.04	0.020	0.03	0.09%	--	3	5
Rice Hulls - Filler for low planting rate mixtures		--	3.000	0.00	0.00%	--	--	--
Grasses Total:			1.630	9.134	25.84%			
Wildflower/Forb/Legume Total:			2.529	26.219	74.16%			
Filler Total:			3.000	0.000	0.00%			
Total Mixture:			7.159	35.354	100.00%			

Bloom Period	Wildflowers Used in Mixture	% PLS Seeding Rate of Mix
1 = April to May	6	15.81%
2 = June to July	31	42.28%
3 = August to October	20	16.08%
Total :	57	

 **4.26 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.nativerrevegetation.org/era/>
- Botanical and beekeeping reference materials that list the pollinator value of species.
- Field observations of floral resource use by pollinator species.