



Promoting Pollinator Habitat Along Roadsides

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We create chemistry

Agenda

- Objectives
- Pollinator Needs
- Mowing
- Herbicides
- Strategies
- Recommendations



Roadside Vegetation Management Objectives

- Safe driving conditions
- Provide line of sight
- Extend equipment life
- Improve pollinator habitat



What Do Pollinators Need?

Early Successional Habitat



Early Successional Habitat for Pollinators

- Food
- Water
- Cover
- Nesting sites



Early Successional Habitat Loss

- USFWS estimated grasslands loss in U.S.
 - 1982 to 1997 97,000 sq. Kilometers, 24M/Ac
 - Area larger than Indiana



Herbicides Create Early Successional Habitat

- Release forbs (flowering plants)
 - Increase in pollinators
- Release legumes
 - Nitrogen fixers
- Increase high quality food
- Provide Cover
 - Release grasses



Creating Early Successional Habitat

0.25% Arsenal + 1% MSO

Before

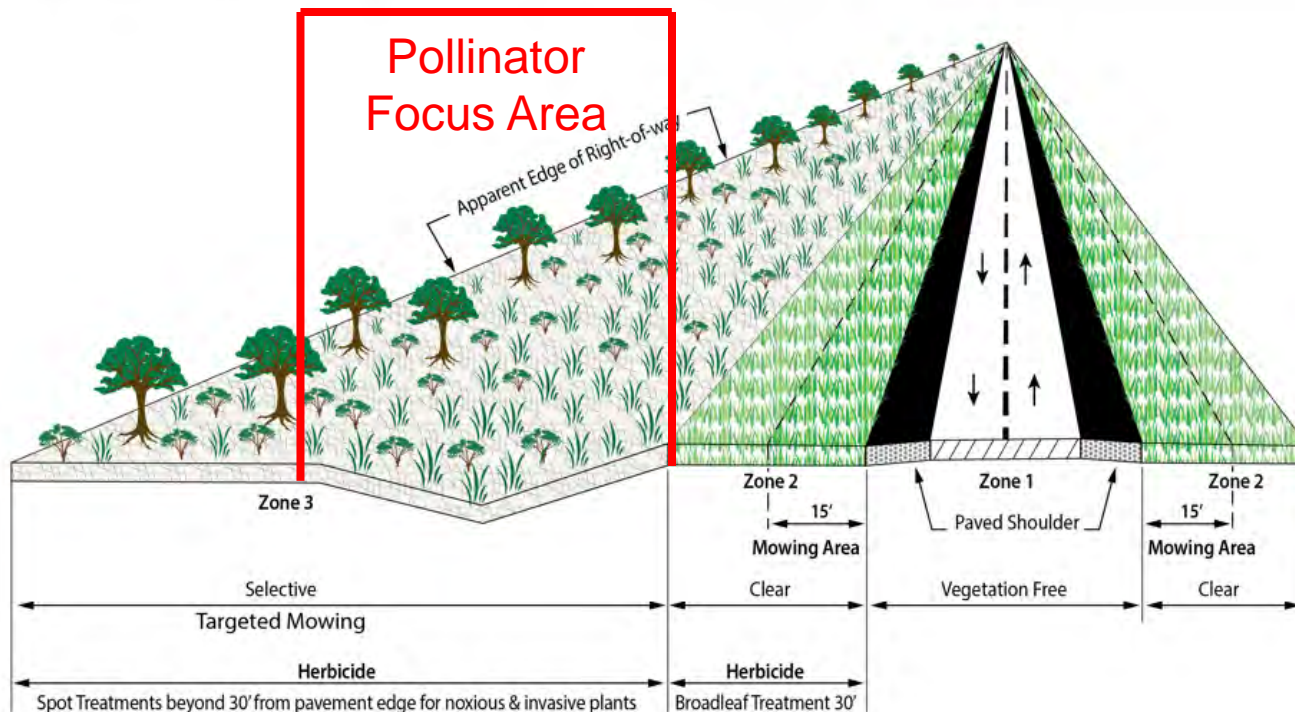
After

Is A Grass Monoculture Good For Pollinators?

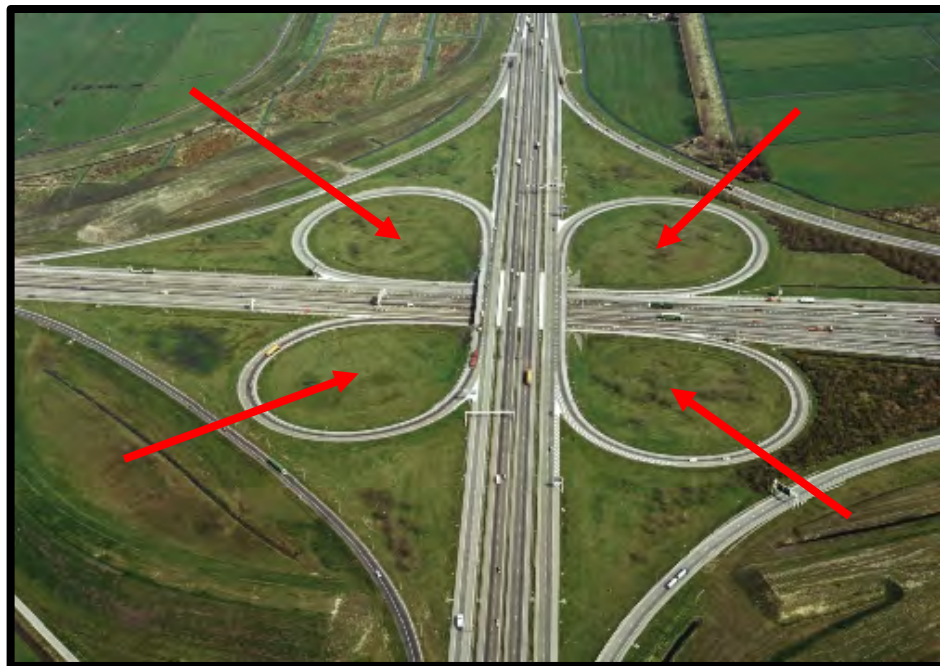


Where To Improve Pollinator Habitat?

Vegetation Management Zones



Where To Improve Pollinator Habitat?



Where To Improve Pollinator Habitat?



Improving Pollinator Habitat

- **Mowing is harmful to pollinator habitat**
- **Create locations with no mowing or reduced mowing**
- **Change mowing timing**
- **Change or drop the broadleaf weed component**



Mowing

Cool Season Grass

- Early mowing results in only 2 weeks of height control
- Mid-summer mowing results in 4 to 8 weeks height control
- Skip mowing until summer
- Better for pollinator species

Warm Season Grass

- Seedhead growth is not reduced by mowing
- Mowing too low can scalp the grass and increase stress

Using Herbicides For Pollinator Habitat

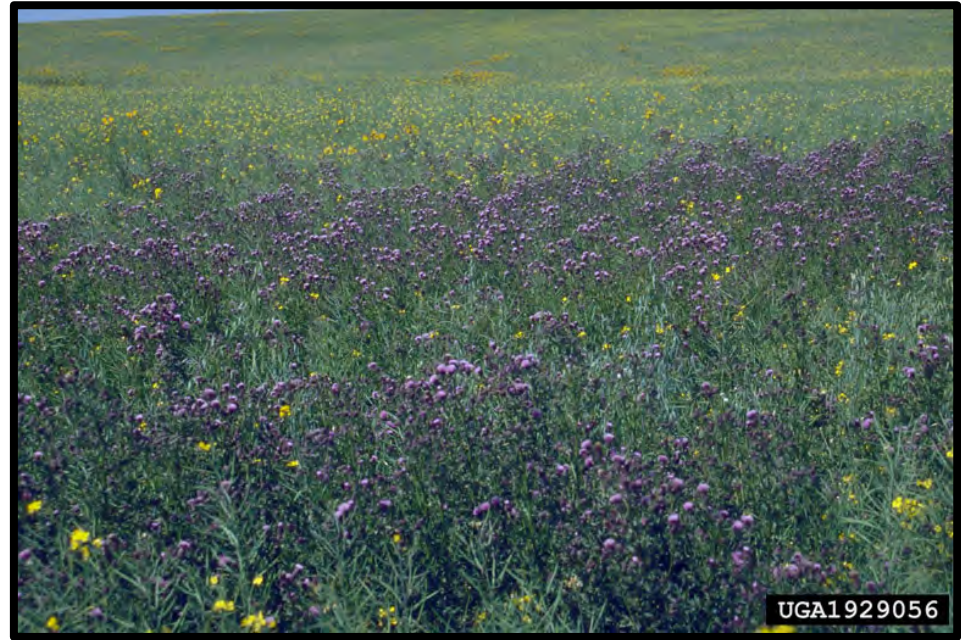
- **Noxious / Invasive Weeds**
- **Grass Growth Regulation**
- **Pollinator Release**
- **Pollinator Planting Establishment**
- **Pollinator Planting Maintenance**

Creating Pollinator Habitat over 2 Years

- **Scout sites - 2020**
- **Spring PGR and broadleaf / noxious weed control - 2020**
 - 3 oz. Plateau + 7 oz. Milestone or 6 oz. Method or 8 oz. Overdrive
- **Spring PGR / Pollinator Release - 2021**
 - 3 oz. Plateau + 1 oz. Detail + 0.3 oz. Escort XP
 - No mowing
- **Look for natural pollinator release - 2021**
- **If minimal pollinators appear then plant spring - 2022**

Scouting

- Understand current vegetation conditions
- Look for noxious / invasive weeds



PGR Program

- **Regulate the height of grass and the development of seedheads to minimize mowing. Adding broadleaf weed control provides longer and more uniform results and can target noxious / invasive weeds**



PGR Program Lessons

- **Use proper rates**
- **Calibration is critical**
- **Uniform application**
- **Add broadleaf weed control**
- **60 – 90 day growth suppression**
- **Dry conditions will extend PGR effects**

Benefits of a PGR Program

- **Reduce Cost**
 - 50% to 70% reduction
- **Increase Productivity**
 - 50% increase
- **Improve Safety**
- **Create time for other work**
- **Minimize need for labor**



2019 OH DOT PGR Results

3 oz. Plateau + 7 oz. Milestone + 0.3 oz. Escort XP



1 MAT

2019 OH DOT PGR Results

3 oz. Plateau + 7 oz. Milestone + 0.3 oz. Escort XP



1 MAT

2019 OH DOT PGR Results

3 oz. Plateau + 7 oz. Milestone + 0.3 oz. Escort XP



2 MAT

2019 OH DOT PGR Results

3 oz. Plateau + 7 oz. Milestone + 0.3 oz. Escort XP



6 MAT

Results

- **Noxious, Invasive and other broadleaf weeds were controlled**
- **No more than one mowing was required**
 - **In many areas no mowing was needed**
- **A cleanup mowing in fall was optional**
- **Many extra maintenance projects were completed with existing personnel**

Pollinator Program

- Use what was learned from the PGR program in Zone 2 and apply it to the pollinator sites in Zone 3 and elsewhere.
- Utilize some of the cost and labor savings to implement and / or enhance your pollinator program



Products – Year 1

■ Plateau

- ▶ Provides grass growth regulation and seedhead suppression

■ Milestone

- ▶ Provides long-term broad spectrum broadleaf weed control

■ Method

- ▶ Provides long-term broad spectrum broadleaf weed control

■ Overdrive

- ▶ Provides broad spectrum broadleaf weed control

All products have CAUTION labels!

Products – Year 2

■ Plateau

- ▶ Provides grass growth regulation and seedhead suppression

■ Detail

- ▶ Provides short term broad spectrum broadleaf weed control

■ Escort XP

- ▶ Provides seedhead suppression and short term broadleaf control

All products have CAUTION labels!

All Products Available As Custom Blends



PGR Program / Pollinator Release – Year 2

- Second year change broadleaf weed components
- Shorter residual products
- In some cases, eliminate broadleaf component



Pollinator Release – Year 2

- 3 oz. Plateau + 1 oz. Detail + .3 oz. Escort XP
- Shorter-term broadleaf weed control allows for pollinator germination the following spring
- Don't mow. Wait to see what comes back naturally



Pollinator Release



3 oz. Plateau + 1 oz. Detail + .5 oz. Escort XP
Sprayed 3 years in a row then did not mow

Pollinator Release Results

- **Dependent on available seed source**
- **Variety of species will be limited**
- **Low cost**



Pollinator Variety is Nice but Expensive

Initial Seeding Cost



100+ acres: \$1,200-\$1,600 Acre

Standard prep for natives

Custom-made sites specific mixes!!!!

Seeding

100 Acres & below: \$1,200-\$1,800 Acre

Standard prep for natives

Custom-made sites specific mixes!!!!

Seeding

This price does not include maintenance. Price also varies based on the seed mix selected

Pollinator Planting Establishment

- Plateau is labeled for wildflower and native grass establishment and maintenance
- Big bluestem, Little bluestem and Indiangrass are tolerant up to 12 oz. Plateau
- Long list of tolerant wildflower and legumes
 - Check tolerance and timing of specific species



KYTC Pollinator / Monarch Seed Mix

Kind	Botanical Name
✖ Butterfly Milkweed	Asclepias tuberosa
✖ Common Milkweed	Asclepias syriaca
✖ Swamp Milkweed	Asclepias incarnata
✖ Whorled Milkweed	Asclepias verticillata
✖ Smooth Beardtongue	Penstemon digitalis
Lance Leaved Coreopsis	Coreopsis lanceolata
Blackeyed Susan	Rudbeckia hirta
Hoary Mountain Mint	Pycnanthemum incanum
Slender Mountain Mint	Pycnanthemum tenuifolium
Early Goldenrod	Solidago juncea
✖ Bergamot	Monarda fistulosa
Spiked Blazing Star	Liatris spicata
Greyheaded Coneflower	Ratibida pinnata
Purple Coneflower	Echinacea purpurea
✖ False Sunflower	Heliopsis helianthoides
Browneyed Susan	Rudbeckia triloba
Joe-Pye Weed	Eupatorium fistulosum
Iron Weed	Vernonia altissima
Sneezeweed	Helenium autumnale
Narrow-Leaved Sunflower	Helianthus angustifolius
New England Aster	Aster novae-angliae
White Wingstem	Verbesina virginica
Indian grass	Sorghastrum nutans
Little bluestem	Schizachyrium scoparium
Partridge Pea	Cassia fasciculata
Compass Plant	Silphium laciniatum
Cardinal Flower	Lobelia cardinalis
Lance-Leaved Goldenrod	Euthamia graminifolia
Boneset	Eupatorium perfoliatum
Spring Oats	Avena sativa

Species on Plateau label

✖ Genus on Plateau label
Unknown Plateau tolerance

Herbicide Selection

■ Native Grass Plantings

- 2-12 oz. Plateau + 1% MSO

Check label for tolerant species



TOLERANT GRASS SPECIES¹

Common Name	Genus Species	Plateau Rate (oz/A) ²	
		Now Seeding	Established
Big Bluestem	<i>Andropogon gerardii</i>	2-12	2-12
Little Bluestem	<i>Schizachyrium scoparium</i>	2-12	2-12
Indiangrass	<i>Sorghastrum nutans</i>	2-12	2-12
Bushy Bluestem	<i>Andropogon glomeratus</i>	—*	2-12
King Ranch Bluestem	<i>Bothriochloa ischaemum</i>	—	2-12
Silver Beard Bluestem	<i>Bothriochloa saccharoides</i>	—	2-12
Broomsedge	<i>Andropogon virginicus</i>	—	2-12
Fingergrass, Rhodes grass	<i>Chloris</i> spp.	—	2-12
Needlegrass	<i>Stipa</i> spp.	—	2-12
Needleandthread	<i>Stipa comata</i>	—	2-12
Kearney (Plains) Threeawn	<i>Aristida longespica</i>	—	2-12
Prairie Threeawn	<i>Aristida oligantha</i>	—	2-12
Prairie Sandreed	<i>Calamovilfa longifolia</i>	—	2-12
Smooth Bromegrass	<i>Bromus inermis</i>	—	2-12
Kentucky Bluegrass	<i>Poa pratensis</i>	—	2-12 ⁴
Sandberg's Bluegrass	<i>Poa sandbergii</i>	—	2-12
Wheatgrasses	<i>Agropyron</i> spp.	—	2-12
Bottlebrush Squirreltail	<i>Sitanion hystrix</i>	—	2-12
Russian Wild Ryegrass	<i>Elymus junceus</i>	2-6 ²	2-12
Sideoats Grama	<i>Bouteloua curtipendula</i>	2-8 ³	2-8
Blue Grama	<i>Bouteloua gracilis</i>	2-8 ³	2-8
Buffalograss	<i>Buchloe dactyloides</i>	2-4	2-8
Eastern Gamagrass	<i>Tripsacum dactyloides</i>	2-6 ³	2-8

¹ See individual grass sections for application timing.

² High rates may result in stunting and growth suppression.

³ Plateau preemergence applications to newly seeded sideoats, blue grama and Eastern gamagrass may result in thinning or loss of stand.

Establishment of Wildflower Plantings

Seedling Wildflower and Legume Tolerance to Plateau® (4 oz/A)¹ in Mixed Grass/Forb Stands.

Common Name	Genus Species	PRE	POST
Alfalfa	<i>Medicago sativa</i>	No	Yes
Aster, New England	<i>Aster novae angliae</i>	No	Yes
Aster, Prairie	<i>Aster tanacetifolius</i>	No	Yes
Baby Blue Eyes	<i>Nemophila menziesii</i>	No	Yes
Beggar ticks	<i>Bidens frondosa</i>	No	Yes
Bird's Eyes	<i>Gilia tricolor</i>	No	Yes
Bishop's Flower	<i>Ammi majus</i>	No	Yes
Blackeyed Susan	<i>Rudbeckia hirta</i>	Yes	Yes
Blanketflower	<i>Gaillardia aristata</i>	No	Yes
Bundleflower, Illinois	<i>Desmanthus illinoensis</i>	Yes	Yes
Catchfly	<i>Silene armeria</i>	No	Yes
Chicory	<i>Cichorium intybus</i>	Yes	Yes
Clover, Crimson	<i>Trifolium incarnatum</i>	Yes	Yes
Clover, White	<i>Trifolium repens</i>	No	Yes
Coneflower, Purple	<i>Echinacea purpurea</i>	Yes	Yes
Coneflower, Upright Prairie	<i>Ratibida columnifera</i>	Yes	Yes
Coreopsis, Dwarf Red Plains	<i>Coreopsis tinctoria</i> var. Gay Feather	Yes	Yes
Coreopsis, Lance Leaved	<i>Coreopsis lanceolata</i>	Yes	Yes
Coreopsis, Plains	<i>Coreopsis tinctoria</i>	Yes	Yes
Comflower	<i>Centaurea cyanus</i>	No	Yes
Cosmos, Garden	<i>Cosmos bipinnatus</i>	Yes	Yes
Cosmos, Yellow	<i>Cosmos sulphureus</i>	Yes	Yes
Daisy, Ox-eye	<i>Chrysanthemum leucanthemum</i>	Yes	Yes
Daisy, Shasta	<i>Chrysanthemum maximum</i>	Yes	Yes
Five Spot	<i>Nemophila maculata</i>	No	Yes
Flax, Blue	<i>Linum perenne</i>	No	Yes
Indian Blanket	<i>Gaillardia pulchella</i>	No	Yes
Indigo, Blue False	<i>Baptisia australis</i>	Yes	No
Johnny Jump-ups	<i>Viola cornuta</i>	Yes	Yes
Lemon Mint	<i>Monarda citriodora</i>	No	Yes

Seedling Wildflower and Legume Tolerance to Plateau® herbicide (4 oz/A)¹ in Mixed Grass/Forb Stands. (CONT):

Common Name	Genus Species	PRE	POST
Lespedeza, Bicolor	<i>Lespedeza</i>	Yes	Yes
Lespedeza, Korean	<i>Lespedeza stipulacea</i>	No	Yes
Lespedeza, Sericea	<i>Lespedeza cuneata</i>	No	Yes
Lupine, Perennial	<i>Lupinus perennis</i>	Yes	Yes
Mexican Hat	<i>Ratibida columnifera</i>	Yes	Yes
Partridgepea	<i>Cassia fasciculata</i>	Yes	Yes
Pea, Calico	<i>Vigna sinensis</i>	Yes	Yes
Pea, Flat	<i>Lathyrus sylvestris</i>	Yes	Yes
Pea, Perennial	<i>Lathyrus latifolius</i>	Yes	Yes
Phlox, Drummond	<i>Phlox drummondii</i>	Yes	No
Poppy, California	<i>Eschscholzia californica</i>	Yes	No
Poppy, Corn	<i>Papaver rhoeas</i>	Yes	Yes
Poppy, Red Corn	<i>Papaver</i> sp.	Yes	Yes
Prairieclover, Purple	<i>Dalea purpurea</i>	Yes	Yes
Prairieclover, White	<i>Dalea candidum</i>	Yes	Yes
Tick-trefoil, Showy	<i>Desmodium canadense</i>	No	Yes
Trefoil, Birdsfoot	<i>Lotus corniculatus</i>	No	Yes
Vetch, Crown	<i>Coronilla varia</i>	Yes	—
Vetch, Hairy	<i>Viola villosa</i>	Yes	—
Yarrow, Gold	<i>Achilles filipendula</i>	No	Yes

¹ For legumes, at least three true leaves should be present before a postemergence application.

Establishment of Wildflower Plantings

Wildflower Establishment with Plateau 4 oz/A + PENDULUM herbicide 2 lbs a.i./A ¹				
Common Name	Genus Species	PRE ²	POST ³	
Blackeyed Susan	<i>Rudbeckia hirta</i>	Yes	Yes	
Blanketflower	<i>Gaillardia pulchella</i>	No	Yes	
Bundleflower, Illinois	<i>Desmanthus illinoensis</i>	>50% thinning	Yes	
Clover, Crimson	<i>Trifolium incarnatum</i>	>50% thinning	Yes	
Coneflower, Clasping	<i>Dracopis amplexicaulis</i>	Yes	Yes	
Coneflower, Upright Prairie	<i>Ratibida columnifera</i>	No	OK	
Coneflower, Purple	<i>Echinacea purpurea</i>	Yes	Yes	
Coreopsis, Dwarf Red Plains	<i>Coreopsis tinctoria</i> var. Gay Feather	OK stunting	OK stunting	
Coreopsis, Plains	<i>Coreopsis tinctoria</i>	OK stunting	Yes	
Coreopsis, Lance Leaved	<i>Coreopsis lanceolata</i>	25% thinning	Yes	
Cornflower	<i>Centaurea cyanus</i>	No	OK 20% thinning	
Cosmos, Garden	<i>Cosmos bipinnatus</i>	OK 10% thinning	OK stunting	
Cosmos, Yellow	<i>Cosmos sulphureus</i>	Yes	Yes	
Daisy, Ox-eye	<i>Chrysanthemum leucanthemum</i>	25% thinning	Yes	
Daisy, Shasta	<i>Chrysanthemum maximum</i>	marginal-OK 20% thinning	Yes	
Lupine, Perennial	<i>Lupinus perennis</i>	Yes	≤50% thinning	
Partridgepea	<i>Cassia fasciculata</i>	25% thinning	Yes	
Poppy, California	<i>Eschscholzia californica</i>	Yes	25% injury stunting, thinning	
Yarrow, Gold	<i>Achillea filipendulina</i>	OK thinning	OK	
¹ 2 lbs a.i./A = 2.4 qts of PENDULUM herbicide 3.3 EC or 3.3 lbs of PENDULUM herbicide WDG				
² Preemergence at planting				
³ Postemergence to seedlings				
Yes = no injury				
No = results in no wildflower germination or unacceptable injury to seedling flowers.				

Native grass and wildflower establishment



- **PLATEAU- pre. 2 oz/A, 1 yr. after treatment and planting**
- **Native grasses, legumes, wildflowers**

Pollinator Plantings Maintenance

Established Wildflower and Legume Tolerance to Plateau (maximum rate¹, oz/A) in Mixed Grass/Forb Stands.

Common Name	Genus Species	PRE	POST ²
Flax, Blue	<i>Linum perenne</i>	0	8
Indian Blanket	<i>Gaillardia pulchella</i>	0	8
Blanketflower	<i>Gaillardia aristata</i>	0	8
Chickory	<i>Oxchorium intybus</i>	4	8
Daisy, Shasta	<i>Chrysanthemum maximum</i>	4	8
Prairieclover, Purple	<i>Dalea purpurea</i>	4	12
Coneflower, Upright Prairie	<i>Ratibida columnifera</i>	6	8
Mexican Hat	<i>Ratibida columnifera</i>	6	8
Poorjoe	<i>Diodia teres</i>	8	—
Lupine, Perennial ⁴	<i>Lupinus perennis</i>	8	12
Coneflower, Purple	<i>Echinacea purpurea</i>	8	8
Daisy, Ox-eye ³	<i>Chrysanthemum leucanthemum</i>	8	8
Leadplant	<i>Amorpha canescens</i>	8	8
Lespedeza, Bicolor	<i>Lespedeza</i>	8	8
Milkweed, Common	<i>Asclepias syriaca</i>	8	—
Pea, Prairie Scurf	<i>Psoralea esculenta</i>	8	8
Yarrow, Gold ³	<i>Achilles filipendula</i>	8	8
Blackeyed Susan	<i>Rudbeckia hirta</i>	8	10
Johnny Jump-ups	<i>Viola cornuta</i>	8	12
Sweetclover	<i>Melilotus</i> sp.	12	8
Alfalfa	<i>Medicago sativa</i>	12	12
Bundleflower, Illinois	<i>Desmanthus illinoensis</i>	12	12
Lespedeza, Sericea	<i>Lespedeza cuneata</i>	12	12
Partridgepea	<i>Cassia fasciculata</i>	12	12
Sensitive vine	<i>Mimosa strigillosa</i>	12	12
Vetch, Crown	<i>Coronilla varia</i>	12	12
Violet, Wild	<i>Viola</i> spp.	12	12

¹ Height suppression or stand reduction may occur at maximum use rate. For legumes, some yellowing and stunting can occur at higher use rates.

² Postemergence application should be made early post on the flowers to reduce injury and increase flower set.

³ Will not flower.

⁴ Most native rangeland lupines are tolerant to Plateau at 12 oz/A postemergence.



Pollinator Tips

- Focus on species with Plateau tolerance
- Separate plantings by Plateau tolerance
 - Pre-emergent versus Post-emergent tolerance
 - No Plateau tolerance
- This aids in Establishment AND Maintenance
- I recommend establishing native grasses first then introduce wildflowers as desired

Creating Pollinator Habitat over 2 Years

- **Scout sites - 2020**
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- **Spring PGR / Pollinator Release - 2021**
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 - No mowing
- **Look for natural pollinator release - 2021**
- **If minimal pollinators appear then plant spring - 2022**

Summary

- We want to help improve roadside vegetation management and increase pollinator habitat
- Let us know how we can help

BASF ProVM Podcasts

- 5 - 7 Minute Podcasts
 - Posted on the ProVM website
 - Timely subjects

www.bettervm.basf.us



BASF ProVM Webinars

- 15 – 40 Minutes
 - Slides and Audio
 - Posted on the ProVM website
 - Timely subjects



www.bettervm.basf.us

Questions?

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Thank You!

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