## Summary Statistics: Establishing Monarch Butterfly Breeding Habitat on Iowa Swine Production Sites

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Table 1, 2, and 3 provide mean count of nectar plant species averaged across all data collection events within a year. Values in table represent the specific floral counting unit for each species (flower head, ramet [stem], spike, or umbel) and is not associated with number of plants. Floral counting units differ between species. Table 4, 5, and 6 provide nectar plant species floral unit density (per m2) averaged across all data collection events within a year. Table 7 provides mean counts of milkweed ramets. This data is unavailable for 2016 and 2017 therefore 2016 and 2017 do not have the associated milkweed ramet tables or figures. Table 8 provides mean density of milkweed ramets.

Figures 1, 2, 3, 4, and 5 are heatmaps which plot the log density of species floral counting units (planted as part of the seed mix and non-planted species) with transects on the columns and species on the rows; transects are sorted by average density and species are sorted by average presence. Figure 6 is a heatmap which plots the log density of milkweed ramets with transects on the columns and species on the rows; transects are sorted by average density and species are sorted by average presence.

Table 1: 2016 nectar plant species: mean count across all surveys

Nectar Plant Species tappla therla therea tprela	tappla	tbcr1a	tbcr2a	tprela	$_{\rm tpre2a}$	tpre3a	tpre4a	$_{ m tpre5a}$	$_{ m tpre6a}$	tpre7a	$_{ m tpre8a}$	ttiela
common dandelion	'	1	ı	1.0	5.0	26.7	26.7   18.7	19.0	1.0 13.7	13.7	17.7	ı
plantain	1	1	1	98.3	6.7	1	1	1	1	17.7	37.3	1
red clover	16.7	1	1	1	1	1	1	1	1	ı	1	1
white clover	3.3	42.0	1	116.3	13.3	763.3	318.3	318.3 624.3	41.7	279.3	365.7	20.7
yellow sweet clover	•		1	•				1.3		1		1

Table 2: 2017 nectar plant species: mean count across all surveys

Nectar Plant Species	tappla therla ther2a tprela tpre2a tpre3a tpre4a tpre5a tpre6a tpre7a tpre8a ttiela	$_{ m tbcr1a}$	tbcr2a	$_{ m tprela}$	$_{ m tpre2a}$	$_{ m tpre3a}$	$_{ m tpre4a}$	tpre5a	$_{ m tpre6a}$	tpre7a	$_{ m tpre8a}$	ttie1s
alfalfa	1	16.7	1	1	1	1	1	1	1	1	1	
black eyed susan	10.7	1	1	0.3	1.7	1.7	0.3	ı	1.7	0.3	1	0.3
black medic	1.0	102.0	1.3	10.3	ı	8.3	0.7	6.7	0.3	ı	2.0	·
blue vervain	1.0	1	ı	1	ı	1	1	ı	1	ı	1	•
common cinquefoil	1	1	1	1	1	1	5.3	1	1	1	0.3	
common dandelion	3.0	5.7	1.7	1.0	6.0	0.9	1.3	2.0	1	ı	ı	1.0
compass plant	0.3	1	1		1	1		1	1	1	1	·
eastern daisy fleabane	•	1	1		33.3	1	ı	1	1	1	1	
marestail	20.3	1	ı	1	1	1	1	'	1	1	1	
musk thistle	1	1	1	1	1.0	1	1	1	1	1	1	
ox eye sunflower	1	1	1	1	1	1	1	1	1	1	1	0.3
partridge pea	2.7	5.0	4.0	1	1	0.3	1	1	0.3	1	1	1.3
pineapple weed	•	1	1	1	10.7	1	1	1	1	1	1	
prostrate vervain	1	70.0	1	1	1	1	ı	1	1	1	155.0	
queen annes lace	1	ı	1	1	1	1.3	I	ı	1	1	1	
red clover	105.7	1	1		1	1		1	1	1	1	
shepherds purse	•	1	1		1	1	ı	1	1	36.7	1	
smartweed	84.0	17.7	39.7	1	151.0	15.0	9.0	10.7	119.0	1	7.3	3.7
velvetleaf	0.7	ı	1	1	1	1	I	ı	1	1	1	
white clover	249.0	33.7	1	9.0	3.3	18.0	32.3	49.3	3.0	11.0	22.3	
vellow coneflower	1	1	1		1	1.7	ı	1	1	ı	1	

Table 3: 2018 nectar plant species: mean count across all surveys

The control of the co	riant openes		37.700										
bell bell bell bell bell bell bell bell	alialia	0.3	1	1	1	ı	1	' 1	1 0	1 1	1	ı	
th the control of the	black eyed susan	1	1	1	•	1	1	2.7	20.3	2.7	7.3	1	
the color of the c	black medic	1	85.3	1	86.3	33.3	3.3	1.7	21.7	1	35.0	36.7	
ch c		1	1	1	2.7	1	21.7	7.7	1	1	1	1	
cold	blue vervain	1	1	1	20.0	1	65.7	1	35.0	5.0	1	1	
ed e	bog yellow-cress	1	1	1	7.3	1	0.7	1	38.0	1	1	ı	
tch 8.3	butterfly milkweed	'	'	'		1		'	1	'	'	1	Ξ
ch 8.3 12.3 5.3 1.7	canada goldenrod		'		'	,	2.0		1	'	0.3	ı	
tch 8.3 - 1. 12. 5. 1.7 - 0.7 - 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.	canada lettiice	1	1	'	'	'	) I	'	'	1	) I	'	21,
Say 230 1230 2.3 1.7 0.1 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2	canada milk vatch		1		1	1		0	1	1		1	i -
billion billio	consider thirth	0	ı	Ì	1.0.0	n c	1 -	:	I	ı	ı	ı	99
by partitions and the state of	canada unsue	0.0	1	1	12.9	0.0	10.1		ı	1		ı	2.07
primtose	catmp	۱ (	1 6	ı	1 6	1 6	7.01	1 0	' 6	1 1	, d	1 0	9
primtrose - 2.7	common cinquetoil	3.0	23.0		94.3	119.3	273.0	205.0	35.3	7.987	153.3	264.0	10.
abane - 2.7 - 28.7 23.3 23.3 23.3	common dandelion	1	5.0	2.3	0.7	12.0	2.0	2.0	0.0	0.7	T:0	×	-
abane - 65.0 - 7.7 277.0 0.7 0.3 0.3 1.7 23.7 - 1    187 101.0 - 2.3 1.0 - 7    188 4.0 1.0 0.3 5.7 18.7 24.0 5.7 6.7 3.3 0.9    18.	common evening primrose	1	2.7	1	28.7	1	1	1	23.3	1	1	1	
abane	cup plant	1	1	65.0	1	1	1	1	1	1	1	1	
nague - 137 101.0 - 2.3 1.0 - 0.7 - 0.3 - 0.7 - 0.7 - 0.3 - 0.7 - 0.7 - 0.3 - 0.7 - 0.7 - 0.3 - 0.7 - 0.3 - 0.7 - 0.3 - 0.7 - 0.3 - 0.7 - 0.3 - 0.7 - 0.3 - 0.3 - 0.7 - 0.3 -		1	1	1	0.7	277.0	0.7	0.3	0.3	1.7	23.7	1	
nngue	field pennycress	1	13.7	101.0	1	1	1	1	1	1	1	1	
bangue 10.7 25.3 25.7 1.0 31.0 38.3 0.7  1.3	field thistle	1	1	1	2.3	1.0	1	0.7	1	1	1	1	
Fig. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.	foxelove beardtonene		,		10.7	25.3	25.7	1.0	31.0	38.3		0.7	16.
40 1.0 0.3 5.7 18.7 24.0 5.7 6.7 3.3 - 0.7  1.3.	colden alexanders	'	'	'	. '	) I	. '		)	)	'	· α	-
over 1.3	boar mounting		-	6	1 14	10	0.70	1 14	2	6 6		1 0	;
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$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Ironweed	0.3	1 1	L.3	1	ı	ı	1	1	1	ı	1	
sd - 1.3 - 2.3 26.3	marestail	13.7	1.7	0.7	1	1	1	1	0.3	1	1	0.3	29.
e 62.7 71.0 4.3 110.0 189.7 477.0 91.3 166.7 1.3 28.7 145.3 1  flower	morning glory	1	1.3	1	1	1	1	1	1	1	1	1	
sign booker	musk thistle	1	1	1	1	44.3	3.3	1	1	1	1	1	
Fraction of the control of the contr	nodding stickseed	1	1	1	3.0	26.3	1	1	1	1	1	1	
aflower - 1.3 - 0.7 - 0.7 - 0 0.7 - 0 0 0	ox eve sunflower	62.7	71.0	4.3	110.0	189.7	477.0	91.3	166.7	1.3	28.7	145.3	128.0
lil	pale purple coneflower	'	'	1.3	'	0.7	'	'	1	'	'	1	2
III	nartridge nes				1 3	1.3						6	
In	paratrage pea				0.1	7:0						i 0	105
n	pincappie wed	1	1	1 1	1	1		1	1	1	1	1	170
bover	prairie cinqueioii	1	· 1	0.7	· 1	1 0	1	1	1	1	1	1	
be cover control of the control of t	prickly lettuce	1	6.7	1	42.7	40.3	1	1	1	1	1	1	
e	prostrate vervain	1	0.7	1	1	1	ı	1	1	1	99.3	24.3	
e 290.7 176.3 - 16.7 1.7 8.3 - 8.3 -		1	1	1	1	1	1	1	1	0.7	1	1	<u>;</u>
18.3	queen annes lace	1	1	1	'	1	1	1	1	1	8.3	1	
in mint 51.3 77.0 1.7 793.0 109.0 1245.3 10.3 4.0 - 18.7 53.0 1.3    - 4.3 68.3 - 104.7 54.3 78.3 - 10.0 - 221.7 2    - 18.3 - 104.7 54.3 78.3 - 10.0 - 22.7 - 221.7 2    - 18.3 - 18.3 - 18.3 2.3 1210.0 1970.3 498.7 403.0 1373.3    - 125.7 0.3 78.0 3.0 2.3 10.3 4.0 - 8.0    - 125.7 0.3 78.0 3.0 2.3 10.3 4.0 - 8.0    - 125.7 0.3 78.0 3.0 2.3 10.3 4.0 - 8.0    - 125.7 119.0 143.7 409.3 788.3 860.0 345.0 836.7 337.0 268.0 528.3 6    - 153.7 119.0 143.7 409.3 788.3 860.0 345.0 836.7 337.0 268.0 528.3 6    - 125.8 119.0 143.7 409.3 788.3 860.0 345.0 836.7 11.0 12.3	red clover	290.7	176.3	1	16.7	1.7	1	1	1	1	1	1	
se - 4.3 68.3	rough cinquefoil	1	1	1	1	1	1	1	ı	1	1	ı	16.
18.3 - 104.7 54.3 78.3 - 10.0 - 221.7 2  Lain mint 9.3 1.0 22.7 1.0  Lain mint 9.3	shepherds purse	1	4.3	68.3	1	1	1	1	1	1	1	1	
tain mint	smartweed	18.3	1	1	104.7	54.3	78.3	1	10.0	1	1	221.7	226.7
tain mint 1.7	stiff goldenrod	1	1	1	'	1	1.0	'	1	1	'	1	
tain mint 9.3	velvetleaf	1	1	1.7	1	1	1	1	ı	1	1	ı	
ster	virginia mountain mint	1	1	1	9.3	1	1	1	1	22.7	1	1	
ster 0.3 37.0 0.3 37.0 0.3 37.0 8.0 8.0	white clover	51.3	717.0	1.7	793.0	109.0	1245.3		1970.3	498.7	403.0	1373.3	4
t - 125.7 0.3 78.0 3.0 2.3 10.3 4.0 - 8.0 - 8.0 - 18.7 55.0 - 18.7 50.7 36.0 31.7 - 18.7 53.0 - 18.7 53.0 - 18.7 53.0 - 18.7 53.0 - 18.7 53.0 - 18.7 53.0 - 18.7 53.0 - 18.3 50.3 10.3 - 18.3 18.3 14.7 23.7 288.3 860.0 345.0 836.7 337.0 268.0 528.3 61.3 18.3 14.7 23.7 - 11.0 12.3	white heath aster	1	1	1	1	ı	1	1	ı	0.3	37.0	ı	
t 0.7 - 39.7 71.7 50.7 36.0 31.7 - 18.7 53.0 3.7 13.3 0.3		1	125.7	0.3	78.0	3.0	2.3	10.3	4.0	1	8.0	1	
wer 153.7 119.0 143.7 409.3 788.3 860.0 345.0 836.7 337.0 268.0 528.3 6 lover 58.0 - 6.7 4.3 1.3 14.7 23.7 - 11.0 12.3	wild bergamot	0.7	'	'	39.7	71.7	50.7	36.0	31.7	'	18.7	53.0	81.
wer 153.7 119.0 143.7 409.3 788.3 860.0 345.0 836.7 337.0 268.0 528.3 slover 58.0 - 6.7 4.3 1.3 14.7 23.7 - 11.0 12.3	wild mistard	'	'		'	. 1	. 1	'		'	3.7	13.3	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	wild parsnip	0.3	,	1	'	1	1	'	ı	,	; '	) 1	
Alover 58.0 - 6.7 4.3 1.3 14.7 23.7 - 11.0 12.3		153.7	119.0	143.7	409.3	788.3	860.0	345 0	836.7	337 0	0.896	528.3	612
30VE - 0.0 - 0.1 4.0 1.0 14.1 20.1 - 11.0 12.0		. ox	2	: :	6.7	> ~		7 5 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	25.7	2		) (	1
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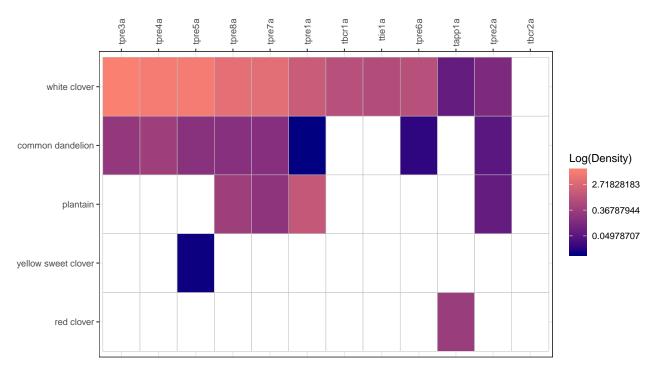


Figure 1: This plot is a heatmap for density of nectar species planted and non-planted with transects on the columns and species on the rows sorting transects by average density and sorting species by avg presence for year 2016.

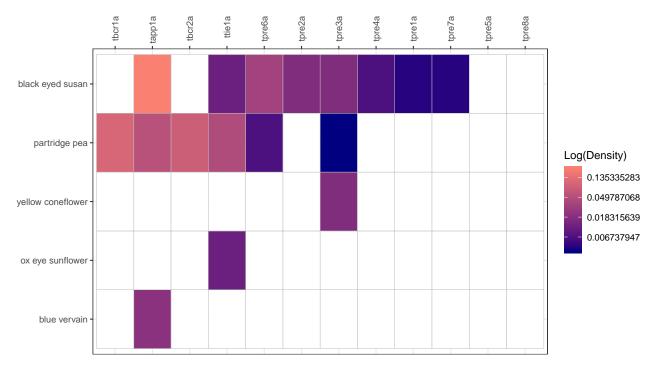


Figure 2: This plot is a heatmap for density of nectar species planted with transects on the columns and species on the rows sorting transects by average density and sorting species by avg presence for year 2017.

Table 4: 2016 nectar plant species density: average density (count / m2) across all rounds

Nectar Plant Species	tappla	tbcrla	tbcr2a	tprela	tpre2a	tpre3a	tpre4a	tpre5a	tpre6a	tpre7a	tpre8a	ttiela
common dandelion	'	'	ı	0.01	0.02	0.27	0.37	0.19	0.02	0.17	0.18	1
plantain $1.23$ 0.07 $0.22$ 0.37 -	1	1	ı	1.23	0.07	ı	1	ı	1	0.22	0.37	1
red clover	0.33	1	ı	1	ı	ı	1	ı	1	ı	ı	1
white clover	0.07	0.84	1	1.46	0.13	7.63	6.37	6.24	0.83	3.49	3.66	0.69
yellow sweet clover	1	1	1	1	1	1	1	0.01	1	1	ı	1

Table 5: 2017 nectar plant species density: average density (count / m2) across all rounds

0.00	гаррта	COCLIA	tbcr2a	$_{ m tprela}$	$_{ m tpre}$	$_{ m tpre3a}$	$_{ m tpre4a}$	tappla tbcrla tbcr2a tprela tpre2a tpre3a tpre4a tpre5a tpre6a tpre7a tpre8a	$_{ m tpre6a}$	tpre/a	$_{\rm tpresa}$	ttiela
alfalfa	1	0.33	1	1	1	1	1	1	1	1	1	'
black eyed susan	0.21	1	1	0.00	0.02	0.02	0.01	1	0.03	0.00	ı	0.01
black medic	0.02	2.04	0.03	0.13	ı	0.08	0.01	0.07	0.01	1	0.02	ı
blue vervain	0.02	1	1	1	ı	1	1	1	1	1	1	ı
common cinquefoil	1	1	1	1	1	1	0.11	1	1	1	0.00	1
common dandelion	0.06	0.11	0.03	0.01	0.06	90.0	0.03	0.02	1	1	ı	0.03
compass plant	0.01	1	1	•	ı	1	1	1	•	1	1	1
eastern daisy fleabane	1	1	1	ı	0.33	1	1	1	•	1	1	ı
marestail	0.41	1	ı	1	ı	ı	1	1	1	ı	1	ı
musk thistle	1	1	1	1	0.01	1	1	1	1	1	1	1
ox eye sunflower	1	1	1	1	1	1	1	1	1	1	1	0.01
partridge pea	0.05	0.10	0.08	1	1	0.00	1	ı	0.01	1	1	0.04
pineapple weed	1	1	1	1	0.11	1	1	1	1	1	1	1
prostrate vervain	1	1.40	1	1	1	1	1	1	1	1	1.55	1
queen annes lace	1	1	1	1	1	0.01	1	1	1	1	1	1
red clover	2.11	1	1	1	1	1	1	1	•	1	1	1
shepherds purse	1	1	1	1	1	1	1	1	•	0.46	1	1
smartweed	1.68	0.35	0.79	1	1.51	0.15	0.18	0.11	2.38	1	0.07	0.12
velvetleaf	0.01	1	1	ı	ı	1	1	1	1	1	1	ı
white clover	4.98	0.67	1	0.11	0.03	0.18	0.65	0.49	0.06	0.14	0.22	1
yellow coneflower	1	1	1	1	1	0.02	1	1	•	1	1	1

Table 6: 2018 nectar plant species density: average density (count  $\ /\ \mathrm{m2}$ ) across all rounds

olfolfo	-											
allalla	0.01	1	1	1	1	'	1 h	' 6	<u>1</u>	' 6	1	
black eyed susan	1	1	1	1	1	1	0.05	0.20	0.05	0.09	1 1	
black medic	1	1.71	1	1.08	0.33	0.03	0.03	0.22	1	0.44	0.37	•
bladder campion	1	1	1	0.03	1	0.22	0.15	1	1	1	1	
blue vervain	1	1	1	0.25	1	0.66	1	0.35	0.10	1	1	
bog yellow-cress	1	1	1	0.09	1	0.01	1	0.38	1	1	1	
butterfly milkweed	'	1	'	1	1	1	1	1	1	1	1	0.03
canada goldenrod	'	1	'	1	1	0.02	1	1	1	0.00	1	·
canada lettuce	1	1	1	1	1	1	1	1	1	1	1	0.72
canada milk vetch	1	ı	1	ı	1	ı	0.01	1	ı	1	1	0.03
canada thistle	0.17	ı	1	0.15	0.05	0.03	1	1	ı	1	1	0.78
catnip	1	ı	1	1	1	0.11	1	1	ı	ı	ı	
common cinquefoil	90.0	0.46	1	1.18	1.19	2.73	4.10	0.35	4.73	1.92	2.64	0.56
common dandelion	1	0.10	0.05	0.08	0.12	0.02	0.04	0.06	0.01	0.01	0.00	0.23
common evening primrose	1	0.05	ı	0.36	1	1	1	0.23	1	1	1	
cup plant	'	1	1.30	1	1	1	1	1	1	1	1	·
eastern daisy fleabane		1		0.01	2.77	0.01	0.01	0.00	0.03	0.30	1	·
field pennycress	1	0.27	2.02	ı	1	1	ı	1	ı	1	1	
field thistle	1	ı	1	0.03	0.01	1	0.01	1	ı	1	1	
foxglove beardtongue	1	1	1	0.13	0.25	0.26	0.02	0.31	0.77	1	0.01	0.53
golden alexanders	•	1		1	1	1	1	•	1	1	0.08	0.06
hoary vervain	0.08	0.02	0.01	0.07	0.19	0.24	0.11	0.02	0.07	1	0.01	0.36
ironweed	0.01	1	0.03	1	1	1	1	1	1	1	1	
marestail	0.27	0.03	0.01	1	1	1	1	0.00	1	1	0.00	0.97
morning glory	1	0.03	1	1	1	1	1	1	1	1	1	
musk thistle	1	ı	1	ı	0.44	0.03	ı	1	ı	ı	1	·
nodding stickseed		1		0.04	0.26	1	1	•	1	1		
ox eve sunflower	1.25	1.42	0.09	1.38	1.90	4.77	1.83	1.67	0.03	0.36	1.45	4.27
pale purple coneflower	1	ı	0.03	1	0.01	1	1	1	1	1	1	0.08
partridge pea	1	1	1	0.02	0.01	1	1	1	1	1	0.02	·
pineapple weed	1	ı	1	ı	1	1	ı	1	ı	1	1	4.17
prairie cinquefoil	1	1	0.01	1	1	1	1	1	1	1	1	
prickly lettuce	1	0.13	ı	0.53	0.40	1	1	1	1	1	ı	·
prostrate vervain		0.01		ı	1	1	1	1	1	1.24	0.24	·
purple prairie clover	1	1	1	1	1	1	1	1	0.01	1	1	0.03
queen annes lace	1	1	1	1	1	1	1	1	1	0.10	1	•
red clover	5.81	3.53	1	0.21	0.02	1	1	1	1	1	1	·
rough cinquefoil	1	1	1	1	1	1	1	1	1	1	1	0.56
shepherds purse	1	0.09	1.37	1	1	ı	1	1	1	1	1	
smartweed	0.37	ı	1	1.31	0.54	0.78	1	0.10	ı	1	2.22	7.56
stiff goldenrod	1	1	1	ı	1	0.01	1	1	1	1	1	•
velvetleaf	1	1	0.03	1	1	1	1	1	1	1	1	
virginia mountain mint	•	ı	•	0.12	1	1	1	1	0.45	1	1	•
white clover	1.03	14.34	0.03	9.91	1.09	12.45	24.20	19.70	9.97	5.04	13.73	0.16
white heath aster	1	1	1	1	1	1	1	1	0.01	0.46	1	
white sweet clover	1	2.51	0.01	0.97	0.03	0.02	0.21	0.04	1	0.10	1	
wild bergamot	0.01	1	1	0.50	0.72	0.51	0.72	0.32	1	0.23	0.53	2.70
wild mustard	•	1	•	1	1	•	1	1	1	0.05	0.13	
wild parsnip	0.01	1	İ	1	1	1	1	1	1	1	1	•
yellow coneflower	3.07	2.38	2.87	5.12	7.88	8.60	06.90	8.37	6.74	3.35	5.28	20.40
vellow sweet clover	7											
TO TO COLOR OF THE	0T.1	1	1	0.08	0.04	0.01	0.29	0.24	1	0.14	0.12	

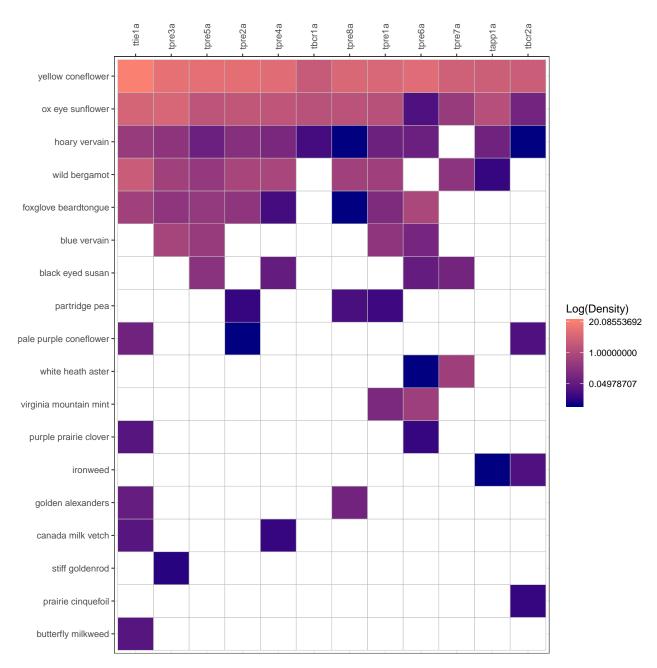


Figure 3: This plot is a heatmap for density of nectar species planted with transects on the columns and species on the rows sorting transects by average density and sorting species by average presence for year 2018.

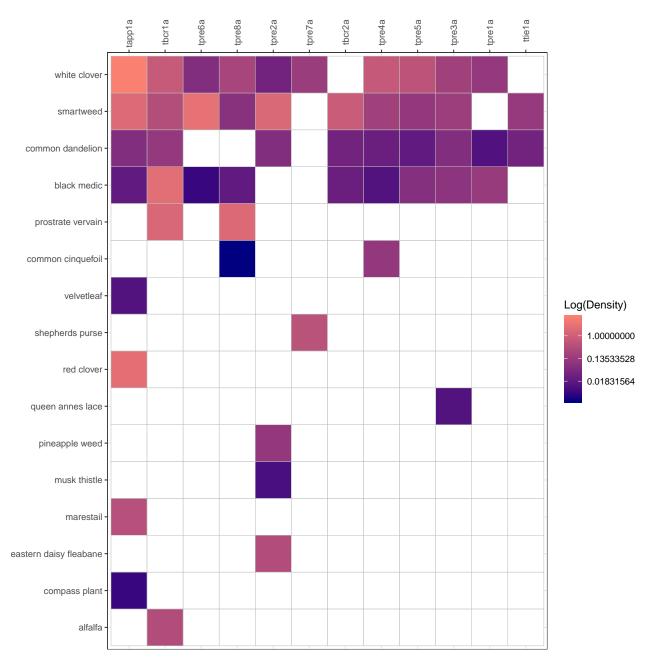


Figure 4: This plot is a heatmap for density of nectar species non planted with transects on the columns and species on the rows sorting transects by average density and sorting species by average presence for year 2017.

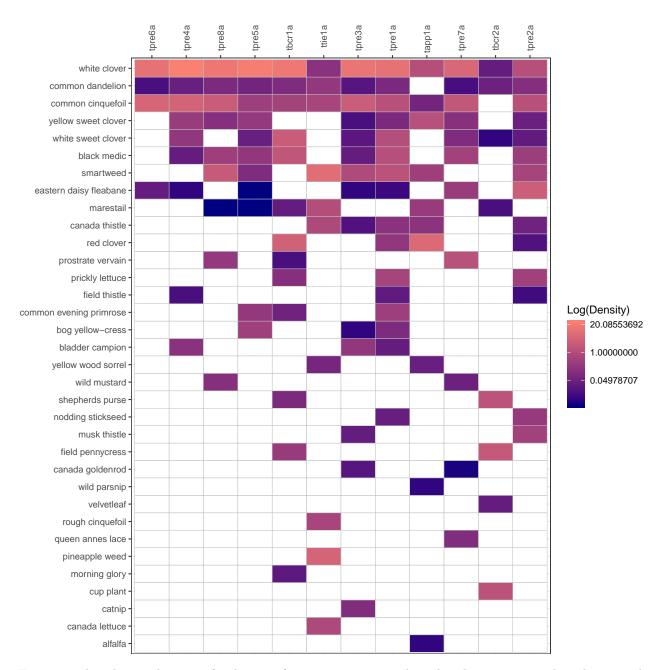


Figure 5: This plot is a heatmap for density of nectar species non planted with transects on the columns and species on the rows sorting transects by average density and sorting species by average presence for year 2018.

Table 7: 2018 ramet plant species: mean count across all surveys

1.		l. <u>.</u>		
++ 	1	0.3	0.7	
tore	3	1	0.7	
tore7a	3			0.3
tore6a	200		1.0	
tores	2001		0.7	
threda	3	-	0.3	
tore3a	2001		5.3	0.3
Corre	3	1	1.0	
torela	3		0.7	
ther2a	3		0.3	
thorla	2	0.3	1.3	
tannla	1		0.3	0.3
Nectar Plant Species		butterfly milkweed ramet	common milkweed ramet	swamp milkweed ramet

Table 8: 2018 ramet plant species density: average density (count / m2) across all rounds

Nectar Plant Species	tappla	tbcr1a	tbcr2a	tprela	tpre2a	tpre3a	tpre4a	tpre5a	tpre6a	tpre7a	tpre8a	ttiela
butterfly milkweed ramet		0.01	-					1	1	1		0.01
common milkweed ramet	0.01	0.03	0.01	0.01	0.01	0.05	0.01	0.01	0.02	1	0.01	0.02
swamp milkweed ramet	0.01	1		1	1	0.00	1	1	•	0.00	1	

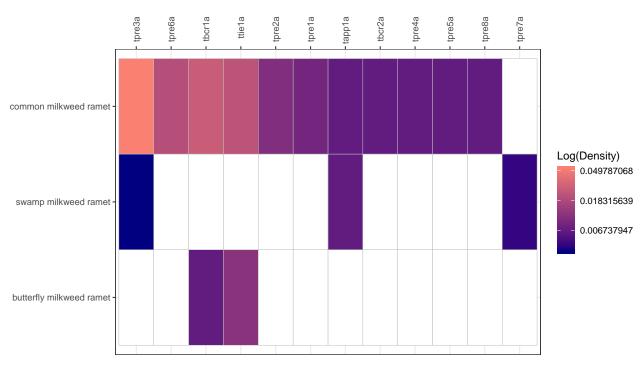


Figure 6: This plot is a heatmap for density of ramet species with transects on the columns and species on the rows sorting transects by average density and sorting species by average presence for year 2018.