

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

Jarad Niemi, Seth Appelgate, and Nehemias Ulloa

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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 | tbyd1a | tbyd2a | tcra1a | tuth3b |
|------------------------|--------|--------|--------|--------|
| alfalfa | 379.0 | 128.7 | - | - |
| black medic | - | 34.0 | - | - |
| blue wild indigo | - | - | - | 1.0 |
| brown eyed susan | - | - | - | 77.0 |
| canada goldenrod | - | - | - | 1.3 |
| canada thistle | - | - | - | 13.7 |
| common cinquefoil | - | - | 8.7 | - |
| common dandelion | - | 1.7 | 1.3 | - |
| common milkweed | - | - | - | 0.3 |
| eastern daisy fleabane | - | - | 3.3 | - |
| red clover | 58.0 | 70.3 | 161.0 | - |
| white clover | 644.7 | 757.0 | 134.3 | - |
| white sweet clover | 3.3 | - | 1.7 | - |
| wild parsnip | 0.3 | - | - | - |
| yellow sweet clover | - | 1.0 | 2.3 | - |

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

| Nectar Plant Species | tbyd1a | tbyd2a | tera1a | tuth3b |
|-------------------------|--------|--------|--------|--------|
| alfalfa | 113.3 | 54.0 | 7.3 | - |
| black eyed susan | 4.7 | 0.3 | 0.7 | 17.3 |
| black medic | 52.3 | 376.7 | - | - |
| brown eyed susan | - | - | 1.0 | - |
| canada thistle | - | - | - | 1.0 |
| common cinquefoil | - | - | 9.7 | - |
| common dandelion | 27.3 | 55.0 | - | 0.7 |
| common evening primrose | - | - | 11.7 | - |
| common milkweed | - | - | - | 0.7 |
| eastern daisy fleabane | - | - | 24.3 | - |
| hawkweed | - | - | - | 127.7 |
| hoary vervain | 0.3 | - | - | - |
| musk thistle | - | - | - | 0.3 |
| partridge pea | 8.0 | 4.7 | 10.3 | 4.7 |
| prickly sowthistle | 4.0 | 5.0 | - | - |
| prostrate vervain | - | - | 1.7 | - |
| red clover | 68.0 | 14.7 | 181.7 | - |
| shepherds purse | 22.7 | 41.0 | - | - |
| smartweed | - | - | 38.0 | - |
| white clover | 450.3 | 402.7 | 196.7 | - |
| wild mustard | - | 7.3 | - | - |

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

| Nectar Plant Species | tbyd1a | tbyd2a | terala | tuth3b |
|---------------------------|--------|--------|--------|--------|
| alfalfa | 273.3 | 51.7 | - | - |
| black eyed susan | 0.3 | 5.0 | 3.3 | 228.7 |
| blue vervain | - | - | 1.7 | - |
| brown eyed susan | - | - | - | 3.3 |
| butterfly milkweed | 3.0 | - | - | - |
| canada thistle | - | 3.0 | - | 6.7 |
| common cinquefoil | - | - | 114.7 | 2.3 |
| common dandelion | 1.0 | 1.3 | - | - |
| common mullein | - | 0.3 | - | 4.0 |
| eastern daisy fleabane | - | - | 24.0 | - |
| foxglove beardtongue | 5.7 | 8.7 | - | - |
| golden alexanders | 0.3 | - | - | - |
| hoary vervain | 9.3 | 1.0 | 1.7 | 0.3 |
| maretail | - | - | 255.3 | 166.7 |
| morning glory | - | - | - | 0.3 |
| musk thistle | - | - | - | 4.7 |
| ox eye sunflower | 236.0 | 144.0 | 48.0 | 13.3 |
| pale purple coneflower | 0.7 | 0.7 | - | - |
| panicledleaf tick trefoil | - | - | - | 3.3 |
| partridge pea | - | - | - | 8.3 |
| prairie cinquefoil | - | 0.3 | - | - |
| prickly lettuce | - | - | 3.3 | - |
| purple prairie clover | - | - | 0.3 | - |
| red clover | 206.3 | 111.3 | 661.3 | - |
| swamp milkweed | - | 0.7 | - | - |
| tall boneset | - | - | 1.0 | - |
| white clover | 2881.7 | 1327.0 | 765.7 | 120.3 |
| white sweet clover | - | 6.7 | 5.7 | - |
| white vervain | - | - | - | 30.0 |
| wild bergamot | 67.7 | 226.3 | - | 12.7 |
| wild mustard | - | - | 30.0 | 13.0 |
| wild parsnip | 15.0 | 13.7 | - | 237.7 |
| yellow coneflower | 590.3 | 687.0 | 116.0 | 181.7 |
| yellow sweet clover | - | 183.0 | - | 3.0 |

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

| Nectar Plant Species | tbyd1a | tbyd2a | tcra1a | tuth3b |
|------------------------|--------|--------|--------|--------|
| alfalfa | 3.79 | 1.29 | - | - |
| black medic | - | 0.34 | - | - |
| blue wild indigo | - | - | - | 0.01 |
| brown eyed susan | - | - | - | 0.77 |
| canada goldenrod | - | - | - | 0.01 |
| canada thistle | - | - | - | 0.14 |
| common cinquefoil | - | - | 0.12 | - |
| common dandelion | - | 0.02 | 0.02 | - |
| common milkweed | - | - | - | 0.00 |
| eastern daisy fleabane | - | - | 0.05 | - |
| red clover | 0.58 | 0.70 | 2.30 | - |
| white clover | 6.45 | 7.57 | 1.92 | - |
| white sweet clover | 0.03 | - | 0.02 | - |
| wild parsnip | 0.00 | - | - | - |
| yellow sweet clover | - | 0.01 | 0.03 | - |

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

| Nectar Plant Species | tbyd1a | tbyd2a | tera1a | tuth3b |
|-------------------------|--------|--------|--------|--------|
| alfalfa | 1.13 | 0.54 | 0.10 | - |
| black eyed susan | 0.05 | 0.00 | 0.01 | 0.17 |
| black medic | 0.52 | 3.77 | - | - |
| brown eyed susan | - | - | 0.01 | - |
| canada thistle | - | - | - | 0.01 |
| common cinquefoil | - | - | 0.14 | - |
| common dandelion | 0.27 | 0.55 | - | 0.01 |
| common evening primrose | - | - | 0.17 | - |
| common milkweed | - | - | - | 0.01 |
| eastern daisy fleabane | - | - | 0.35 | - |
| hawkweed | - | - | - | 1.28 |
| hoary vervain | 0.00 | - | - | - |
| musk thistle | - | - | - | 0.00 |
| partridge pea | 0.08 | 0.05 | 0.15 | 0.05 |
| prickly sowthistle | 0.04 | 0.05 | - | - |
| prostrate vervain | - | - | 0.02 | - |
| red clover | 0.68 | 0.15 | 2.60 | - |
| shepherds purse | 0.23 | 0.41 | - | - |
| smartweed | - | - | 0.54 | - |
| white clover | 4.50 | 4.03 | 2.81 | - |
| wild mustard | - | 0.07 | - | - |

Table 6: 2018 nectar plant species density: average density (count / m²) across all rounds

| Nectar Plant Species | tbyd1a | tbyd2a | terala | tuth3b |
|---------------------------|--------|--------|--------|--------|
| alfalfa | 2.73 | 0.52 | - | - |
| black eyed susan | 0.00 | 0.05 | 0.05 | 2.29 |
| blue vervain | - | - | 0.02 | - |
| brown eyed susan | - | - | - | 0.03 |
| butterfly milkweed | 0.03 | - | - | - |
| canada thistle | - | 0.03 | - | 0.07 |
| common cinquefoil | - | - | 1.64 | 0.02 |
| common dandelion | 0.01 | 0.01 | - | - |
| common mullein | - | 0.00 | - | 0.04 |
| eastern daisy fleabane | - | - | 0.34 | - |
| foxglove beardtongue | 0.06 | 0.09 | - | - |
| golden alexanders | 0.00 | - | - | - |
| hoary vervain | 0.09 | 0.01 | 0.02 | 0.00 |
| maretail | - | - | 3.65 | 1.67 |
| morning glory | - | - | - | 0.00 |
| musk thistle | - | - | - | 0.05 |
| ox eye sunflower | 2.36 | 1.44 | 0.69 | 0.13 |
| pale purple coneflower | 0.01 | 0.01 | - | - |
| panicledleaf tick trefoil | - | - | - | 0.03 |
| partridge pea | - | - | - | 0.08 |
| prairie cinquefoil | - | 0.00 | - | - |
| prickly lettuce | - | - | 0.05 | - |
| purple prairie clover | - | - | 0.00 | - |
| red clover | 2.06 | 1.11 | 9.45 | - |
| swamp milkweed | - | 0.01 | - | - |
| tall boneset | - | - | 0.01 | - |
| white clover | 28.82 | 13.27 | 10.94 | 1.20 |
| white sweet clover | - | 0.07 | 0.08 | - |
| white vervain | - | - | - | 0.30 |
| wild bergamot | 0.68 | 2.26 | - | 0.13 |
| wild mustard | - | - | 0.43 | 0.13 |
| wild parsnip | 0.15 | 0.14 | - | 2.38 |
| yellow coneflower | 5.90 | 6.87 | 1.66 | 1.82 |
| yellow sweet clover | - | 1.83 | - | 0.03 |

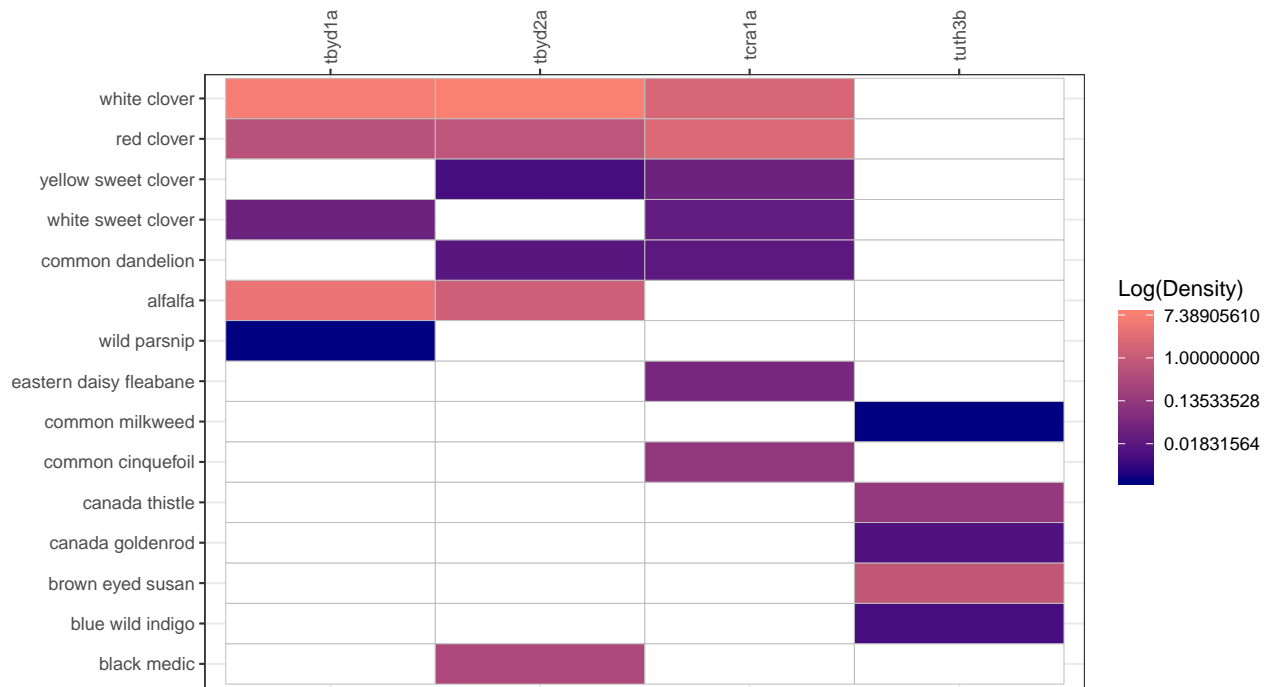


Figure 1: This plot is a heatmap for density of nectar species planted and non-planted with transects on the columns and species on the rows sorting transects by average density and sorting species by avg presence for year 2016.

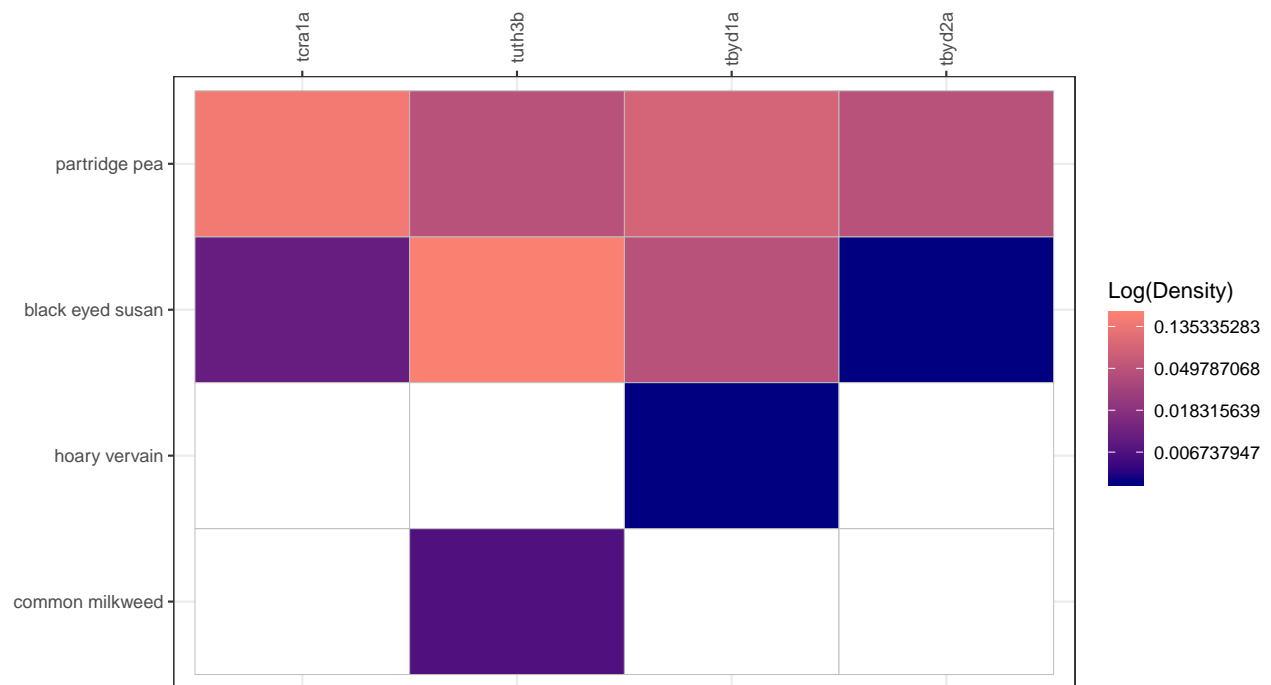


Figure 2: This plot is a heatmap for density of nectar species planted with transects on the columns and species on the rows sorting transects by average density and sorting species by avg presence for year 2017.

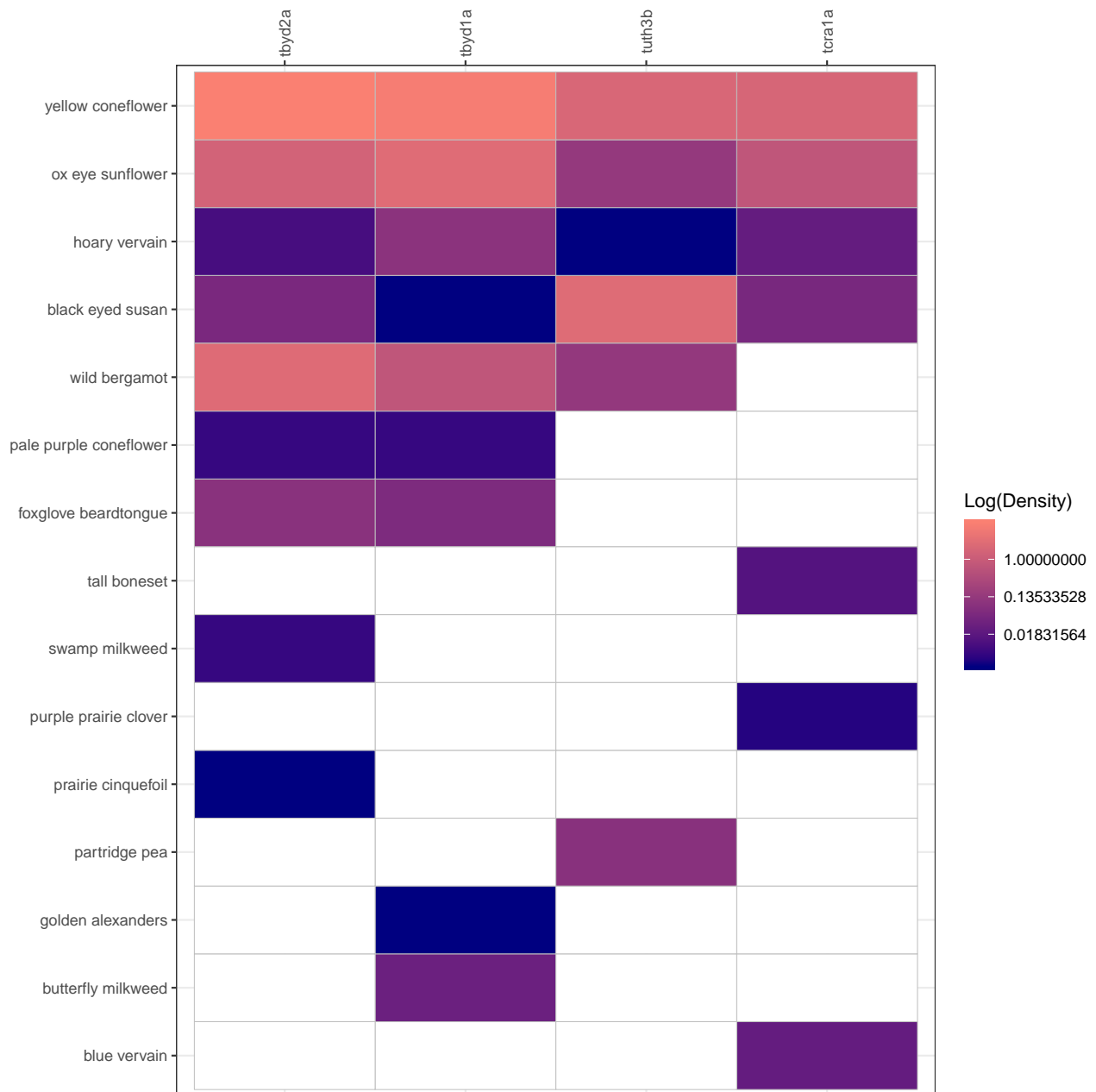


Figure 3: This plot is a heatmap for density of nectar species planted with transects on the columns and species on the rows sorting transects by average density and sorting species by average presence for year 2018.

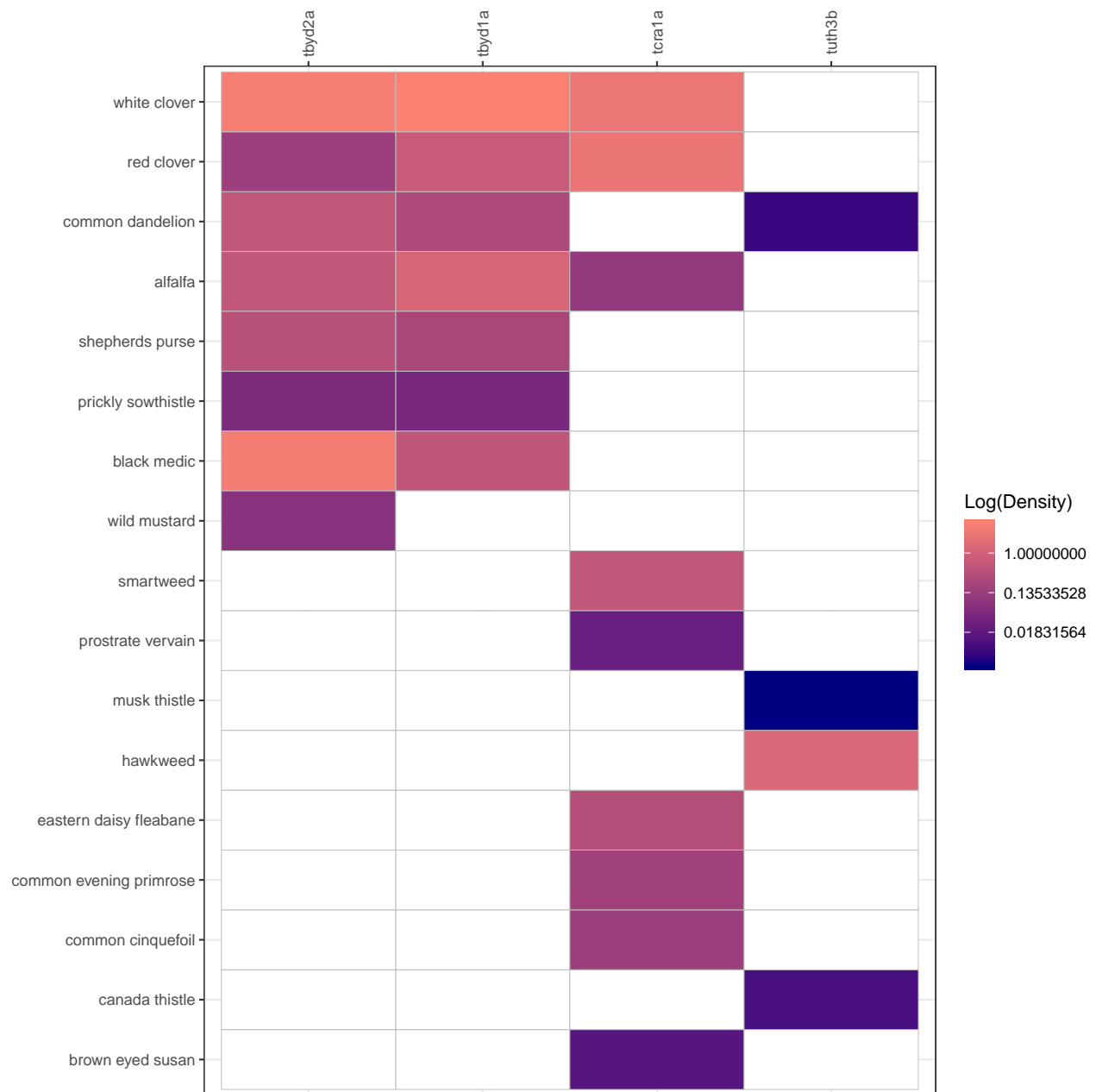


Figure 4: This plot is a heatmap for density of nectar species non planted with transects on the columns and species on the rows sorting transects by average density and sorting species by average presence for year 2017.

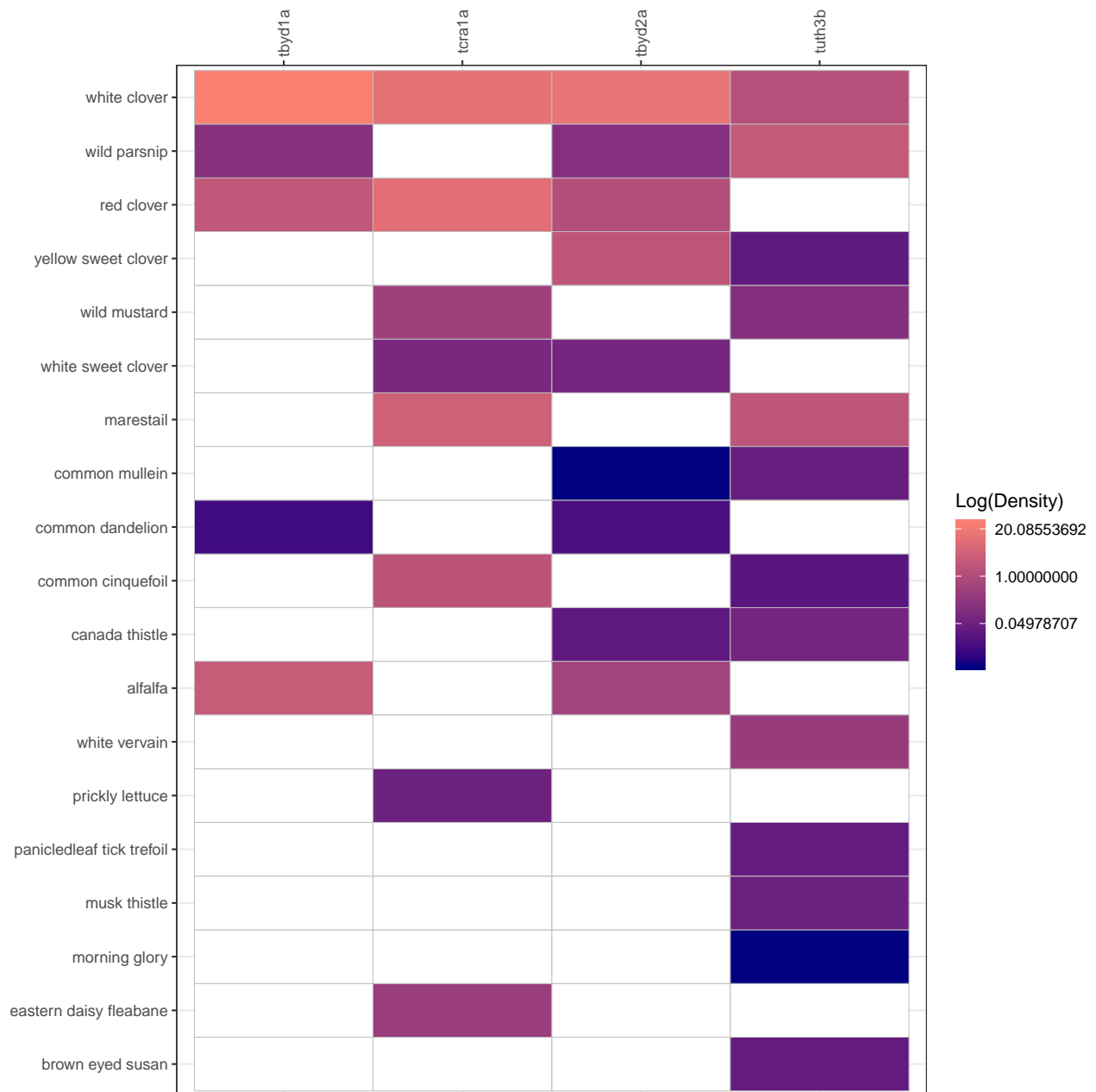


Figure 5: This plot is a heatmap for density of nectar species non planted with transects on the columns and species on the rows sorting transects by average density and sorting species by average presence for year 2018.

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

| Nectar Plant Species | tbyd1a | tbyd2a | terala | tutb3b |
|--------------------------|--------|--------|--------|--------|
| butterfly milkweed ranet | 0.3 | - | - | - |
| common milkweed ranet | 2.3 | 1.7 | 2.3 | 7.3 |
| swamp milkweed ranet | - | 0.3 | - | - |

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

| Nectar Plant Species | tbyd1a | tbyd2a | tcra1a | tutb3b |
|--------------------------|--------|--------|--------|--------|
| butterfly milkweed ramet | 0.00 | - | - | - |
| common milkweed ramet | 0.02 | 0.02 | 0.03 | 0.07 |
| swamp milkweed ramet | - | 0.00 | - | - |

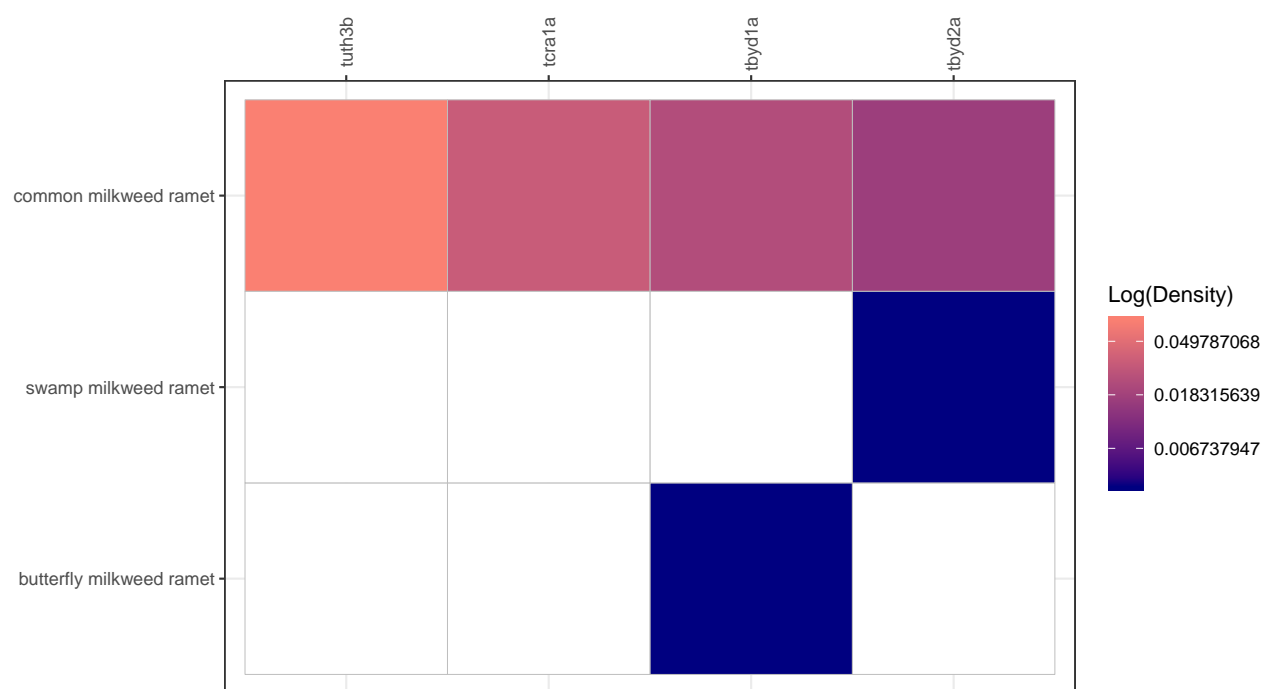


Figure 6: This plot is a heatmap for density of ramet species with transects on the columns and species on the rows sorting transects by average density and sorting species by average presence for year 2018.