Diet Analysis using Fecal Metabarcoding for MGS: Preliminary Results

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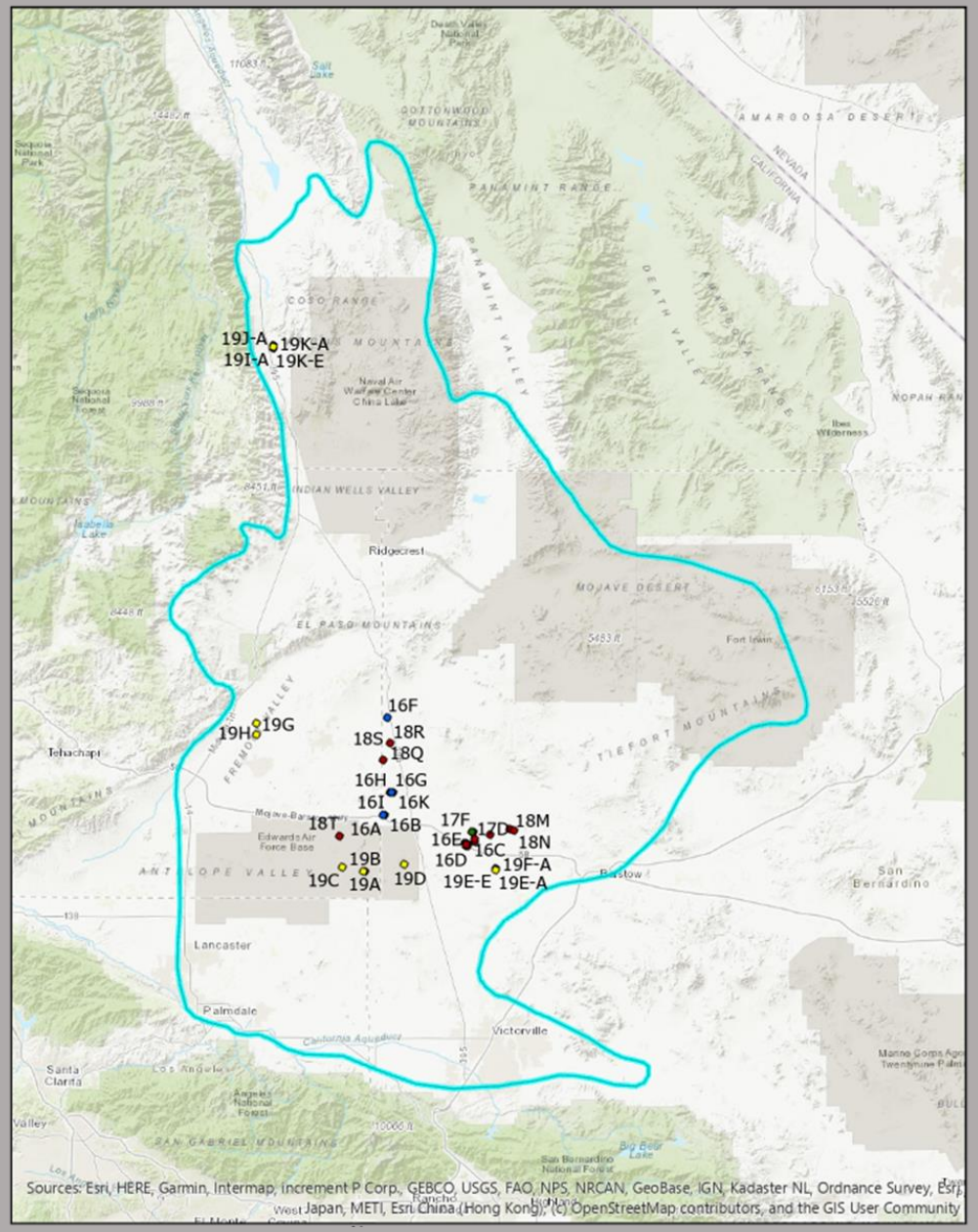
Poop

- Samples from 61 individual MGS
- Focused on Hinkley (now called Harper Lake based on MGS Conservation Strategy) and EAFB/Bowling Alley (now called North of Kramer)
- 20 from EAFB/Bowling Alley from 2016, 2018, 2019
- 35 from Harper Lake from 2016-2019
- 2 from Cal City in 2019
- 6 from Rose Valley in 2019



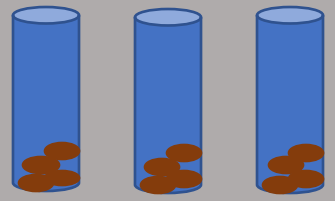
Plants

- Have to determine what plants we think they're eating
- Barbara & Erica (mostly Barbara) put together a list of possible plants from informal surveys in March & from other reports across the range
- Cody checked which plants are available in DNA barcode databases
- Obtained field samples or herbarium samples to sequence missing plants

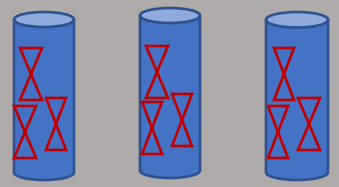
Pipettes

<u>Sample Preparation</u>

1) Buffer & Filter Samples

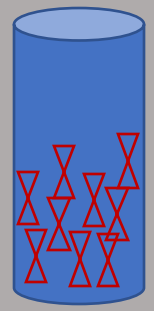


2) Cut out ITS2 region and amplify



3) DNA Clean Up

4) Quantification & Normalization



5) Sequencing

5) Bioinformatics

AATGCGCTTAACG
TATGCGCTTTACG
ATTGCGCTTAACG
ATTCCGCTTAAGG

Sources of Error in Fecal Metabarcoding

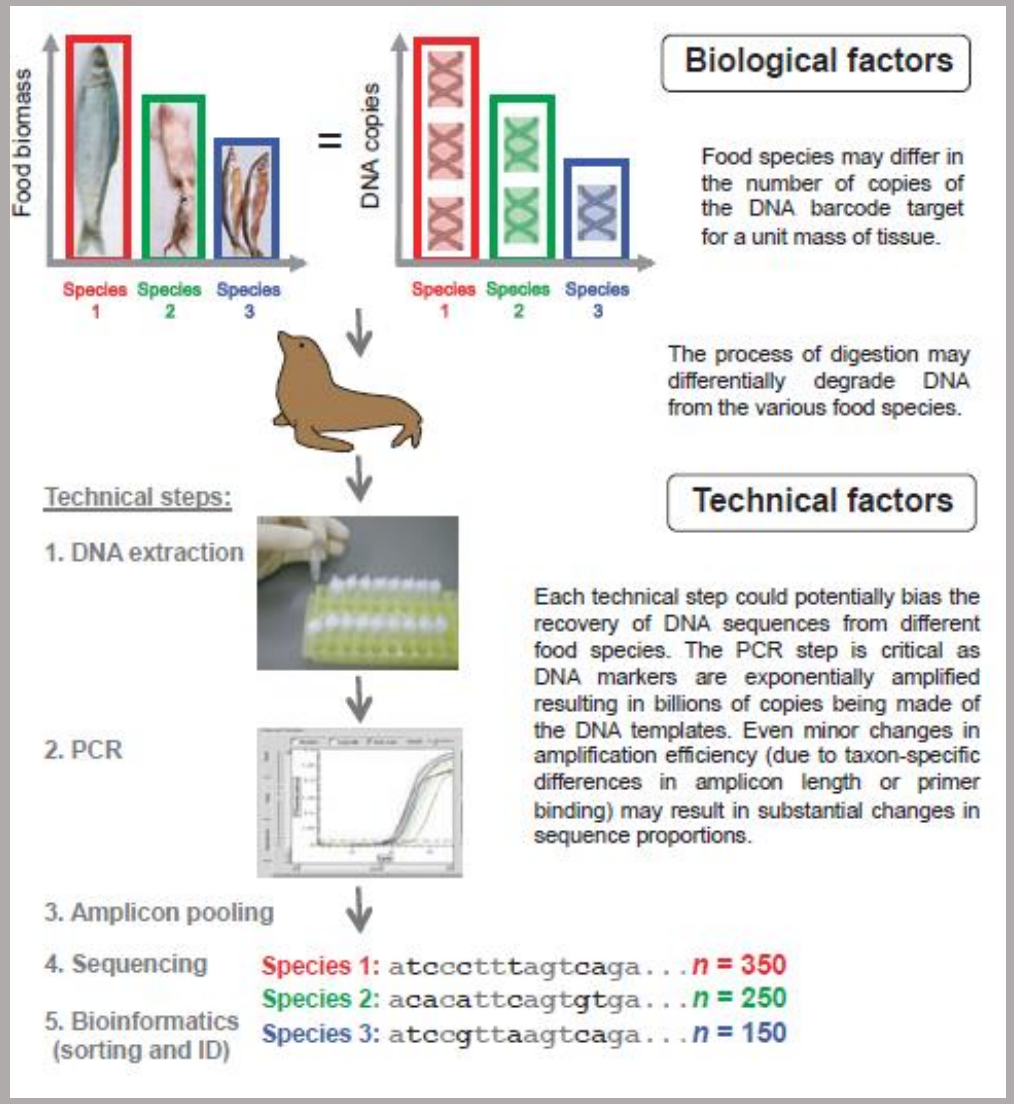


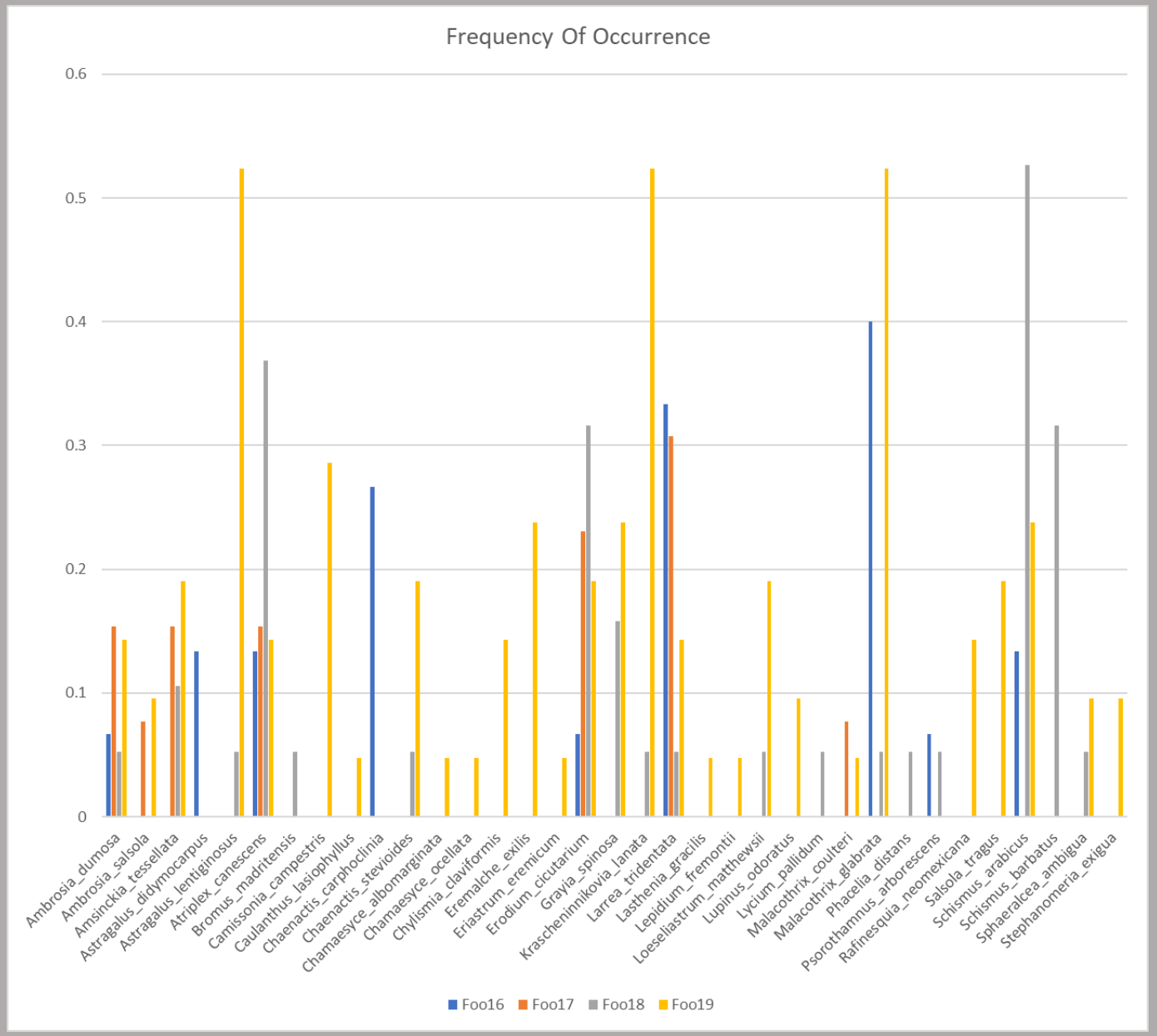
Figure 3 from Pompanon et al. 2012

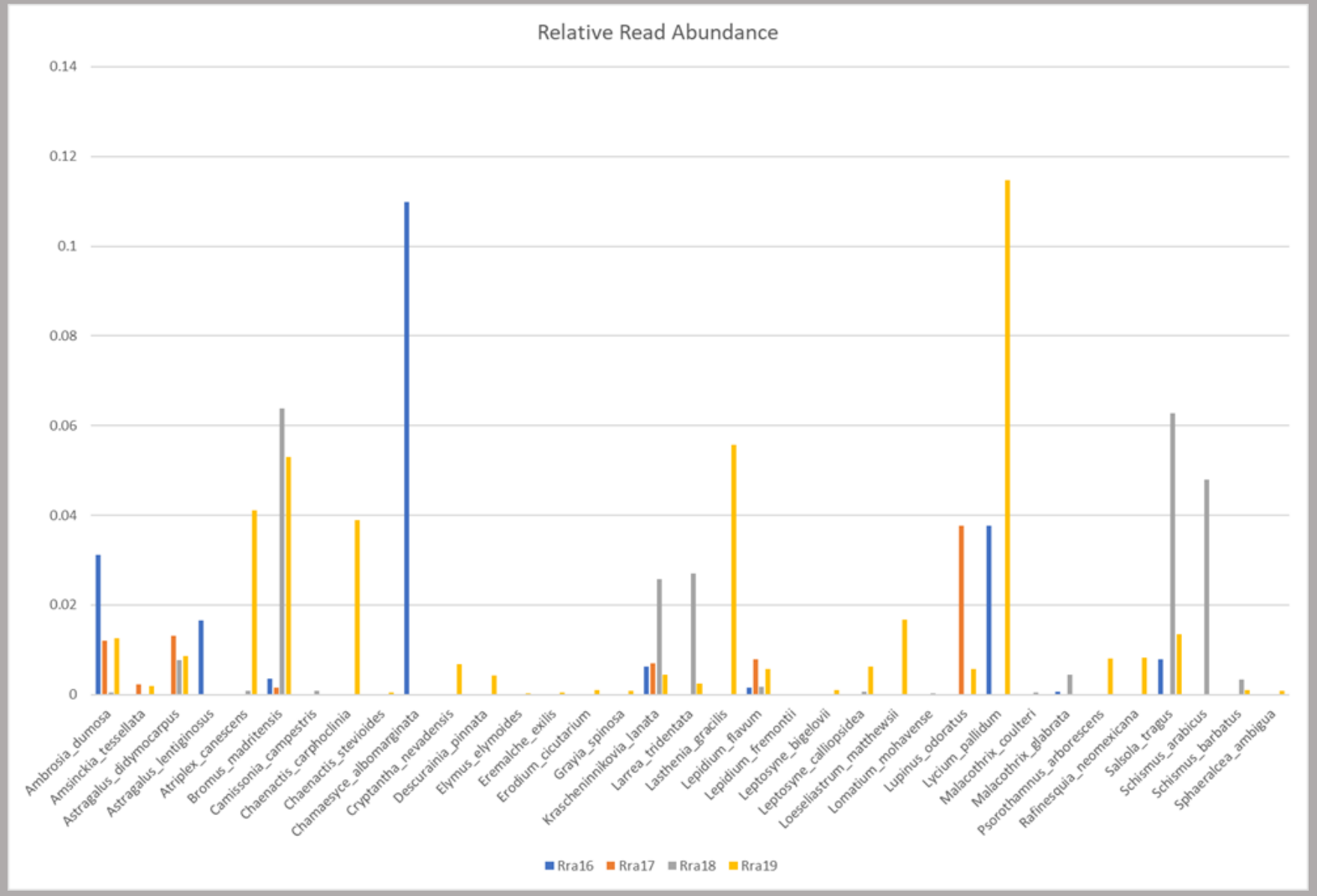
Results: Fecal Sample Collection

- A lot of the DNA was degraded or difficult to identify

- 8 pairs of ethanol/air dried for comparison from 2019

	Success Rate	Proportion Plant DNA	Species Richness
Air Dried	62.5%	0.46	25
Ethanol	100%	0.63	29


Frequency Of Occurrence
0.6
0.5
0.4
0.3
0.2
0.1
0
Ambrosia_dumosa
Ambrosia_salsola
Amsinckia_tessellata
Astragalus_didymocarpus
Astragalus_lentiginosus
Atriplex_canescens
Bromus_madritensis
Camissonia_campestris
Caulanthus_lasiophyllus
Chaenactis_carphoclinia
Chaenactis_stevioides
Chamaesyce_albomarginata
Chamaesyce_ocellata
Chylismia_claviformis
Eremalche_exilis
Eriastrum_eremicum
Erodium_cicutarium
Gravia_spinosa
Kraschenninnikovia_lanata
Larrea_tridentata
Lasthenia_gracilis
Lepidium_fremontii
Loeseliastrum_matthewsii
Lupinus_odoratus
Lycium_pallidum
Malacothrix_coulteri
Malacothrix_glabrata
Phacelia_distans
Psorothamnus_arborescens
Rafinesquia_neomexicana
Salsola_tragus
Schismus_arabicus
Schismus_barbatus
Sphaeralcea_ambigua
Stephanomeria_exigua
Foo16
Foo17
Foo18
Foo19


Relative Read Abundance
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
Ambrosia_dumosa
Amsinckia_tessellata
Astragalus_didymocarpus
Astragalus_lentiginosus
Atriplex_canescens
Bromus_madritensis
Camissonia_campestris
Chaenactis_carphoclinia
Chaenactis_stevioides
Chamaesyce_albomarginata
Cryptantha_nevadensis
Descurainia_pinnata
Elymus_elymoides
Eremalche_exilis
Erodium_cicutarium
Grayia_spinosa
Krascheninnikovia_lanata
Larrea_tridentata
Lasthenia_gracilis
Lepidium_flavum
Lepidium_fremontii
Leptosyne_bigelovii
Leptosyne_calliopsidea
Loeseliastrum_matthewsii
Lomatium_mohavense
Lupinus_odoratus
Lycium_pallidum
Malacothrix_coulteri
Malacothrix_glabrata
Psorothamnus_arborescens
Rafinesquia_neomexicana
Salsola_tragus
Schismus_arabicus
Schismus_barbatus
Sphaeralcea_ambigua
Rra16
Rra17
Rra18
Rra19

Dry vs. Wet

- Analysis of Similarity (how similar are groups to each other?)

Dry Samples (N = 16)

Wet Samples (N = 25)

Analysis of similarity = 0.1304

There is some difference between dry and wet years in relative read abundance of certain diet items