Diet Vectors v. Taxonomy

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Are diet vectors associated with microbiome taxa?

Tried with taxonomy clr - Yes at the family level.

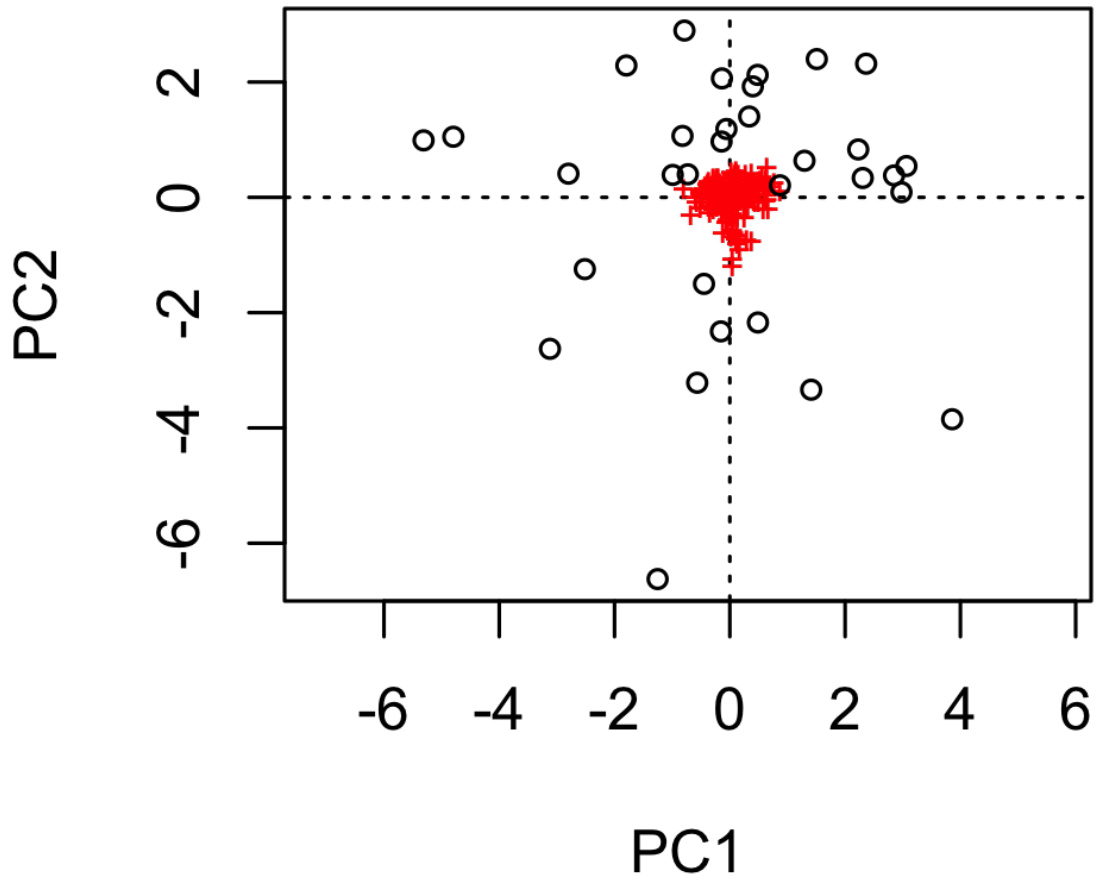
```
##                                                taxa food_vector
## tmp                    k__Bacteria;p__Firmicutes;NA      Axis.3
## tmp.1 k__Bacteria;p__Firmicutes;c__Erysipelotrichia      Axis.3
## tmp.2               k__Bacteria;p__Bacteroidetes;NA      Axis.5
## tmp.3    k__Bacteria;p__Bacteroidetes;c__Bacteroidia      Axis.5
##              correlation       pvalue     qvalue
## tmp   -0.548020527859237 0.0011666124 0.04966904
## tmp.1 -0.533724340175953 0.0016556347 0.04966904
## tmp.2  0.557551319648094 0.0009157234 0.04966904
## tmp.3  0.464809384164223 0.0073556224 0.16550150
```

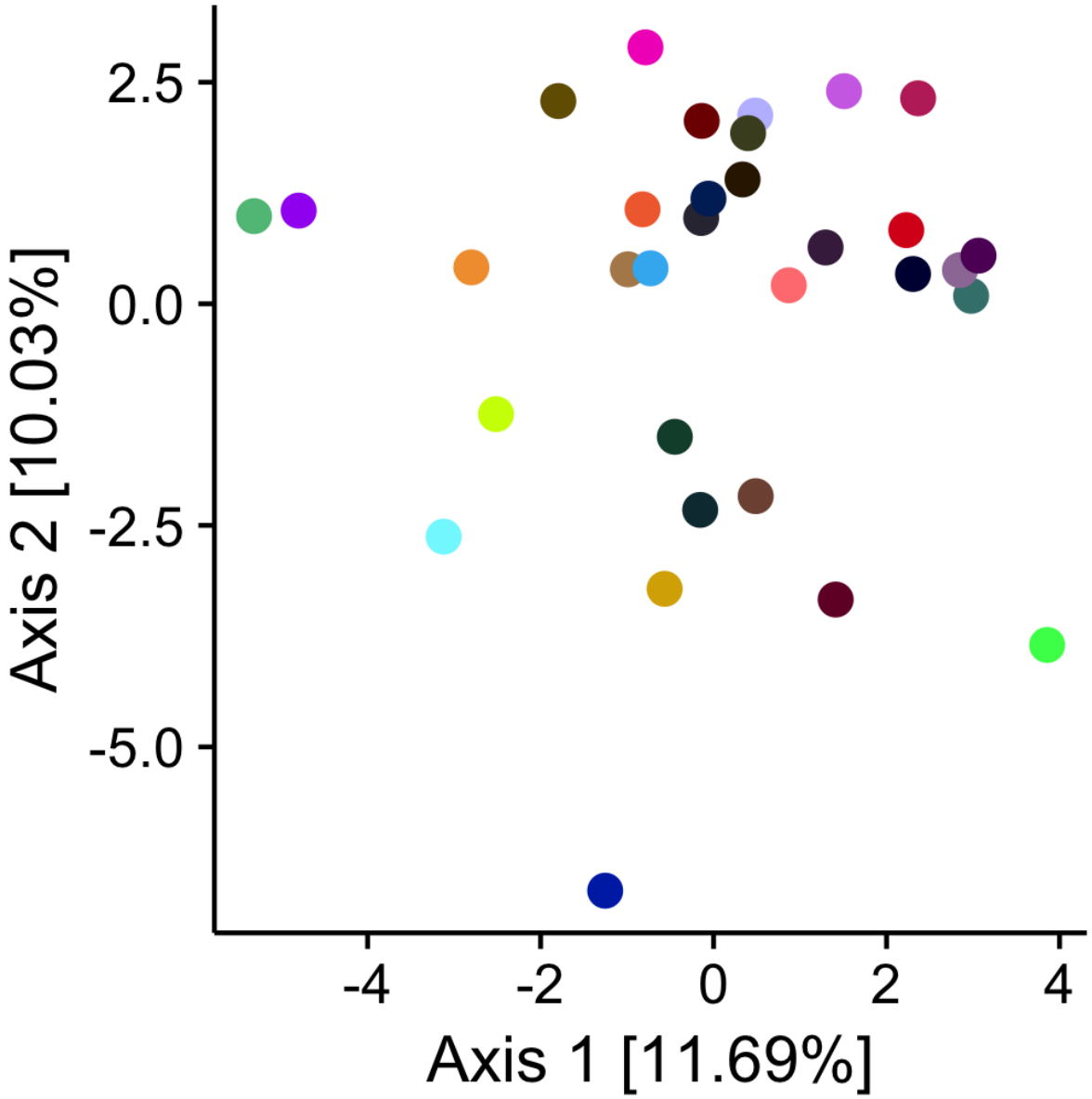
which foods are associated with food vectors?

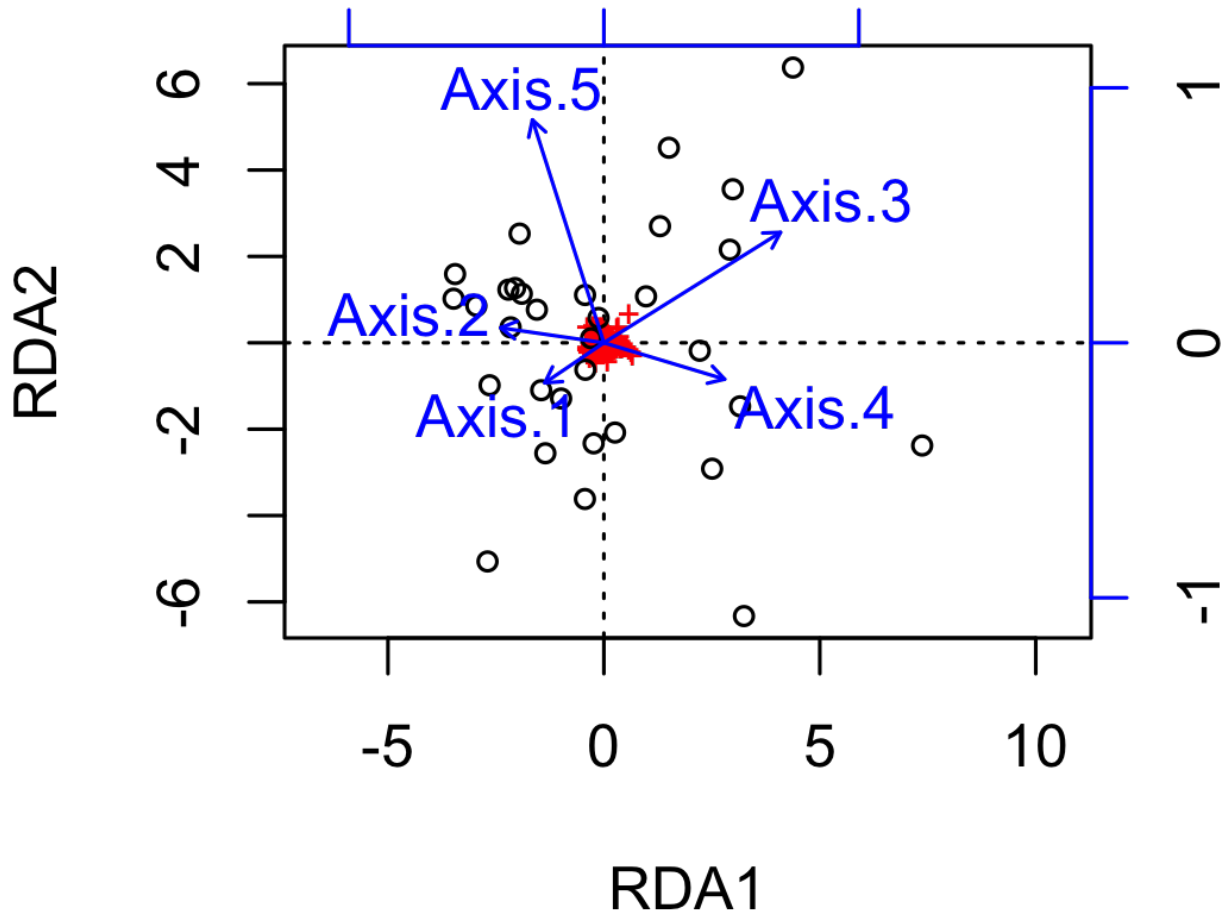
```
##
## tmp    L1_Grain_Product;L2_Grain_mixtures_frozen_plate_meals_soups;L3_Mixtures_mainly_grain_pasta_or
## tmp.2                                  L1_Vegetables;L2_Darkgreen_vegetables;L3_Darkgreen_leafy_veget
## tmp.4                                                L1_Fruits;L2_Citrus_fruits_juices;L3_Citrus_fruit_
## tmp.11                                    L1_Milk_and_Milk_Products;L2_Milks_and_milk_drinks;L3_Milk
## tmp.1          L1_Sugars_Sweets_and_Beverages;L2_Sugars_and_sweets;L3_Syrups_honey_molasses_sweet_top
## tmp.3                                                 L1_Fats_Oils_and_Salad_Dressings;L2_Fats;L3_Table
## tmp.5                        L1_Milk_and_Milk_Products;L2_Creams_and_cream_substitutes;L3_Sweet_dairy_
## tmp.13                                     L1_Sugars_Sweets_and_Beverages;L2_Sugars_and_sweets;L3_Ca
## tmp.8                                            L1_Meat_Poultry_Fish_and_Mixtures;L2_Poultry;L3_Ch
## tmp.9                                   L1_Milk_and_Milk_Products;L2_Milks_and_milk_drinks;L3_Milk
## tmp.12   L1_Grain_Product;L2_Cakes_cookies_pies_pastries_bars;L3_Cobblers_eclairs_turnovers_other_pas
## tmp.14                                    L1_Grain_Product;L2_Cakes_cookies_pies_pastries_bars;L3_Co
## tmp.6         L1_Grain_Product;L2_Crackers_and_salty_snacks_from_grain;L3_Salty_snacks_from_grain_pro
## tmp.7                                      L1_Grain_Product;L2_Cakes_cookies_pies_pastries_bars;L3
## tmp.10               L1_Grain_Product;L2_Cereals_not_cooked_or_NS_as_to_cooked;L3_Cereal_grains_not_c
##        food_vector        correlation       pvalue       qvalue
## tmp         Axis.1 -0.905425219941349 1.087627e-12 1.089803e-09
## tmp.2       Axis.1  0.582515662134975 4.686561e-04 1.565311e-01
## tmp.4       Axis.2  0.563581079967808 7.826980e-04 1.568527e-01
## tmp.11      Axis.2  0.515969629853862 2.504791e-03 2.091500e-01
## tmp.1       Axis.3 -0.611637949587407 1.997104e-04 1.000549e-01
## tmp.3       Axis.3  -0.57031766151435 6.544602e-04 1.568527e-01
## tmp.5       Axis.3 -0.554795299727118 9.828699e-04 1.641393e-01
## tmp.13      Axis.3 -0.505911467618326 3.136467e-03 2.244814e-01
## tmp.8       Axis.4 -0.529309507168315 1.839011e-03 1.958558e-01
## tmp.9       Axis.5 -0.526718997142484 1.954649e-03 1.958558e-01
## tmp.12      Axis.5  0.507662712746659 3.017493e-03 2.244814e-01
```

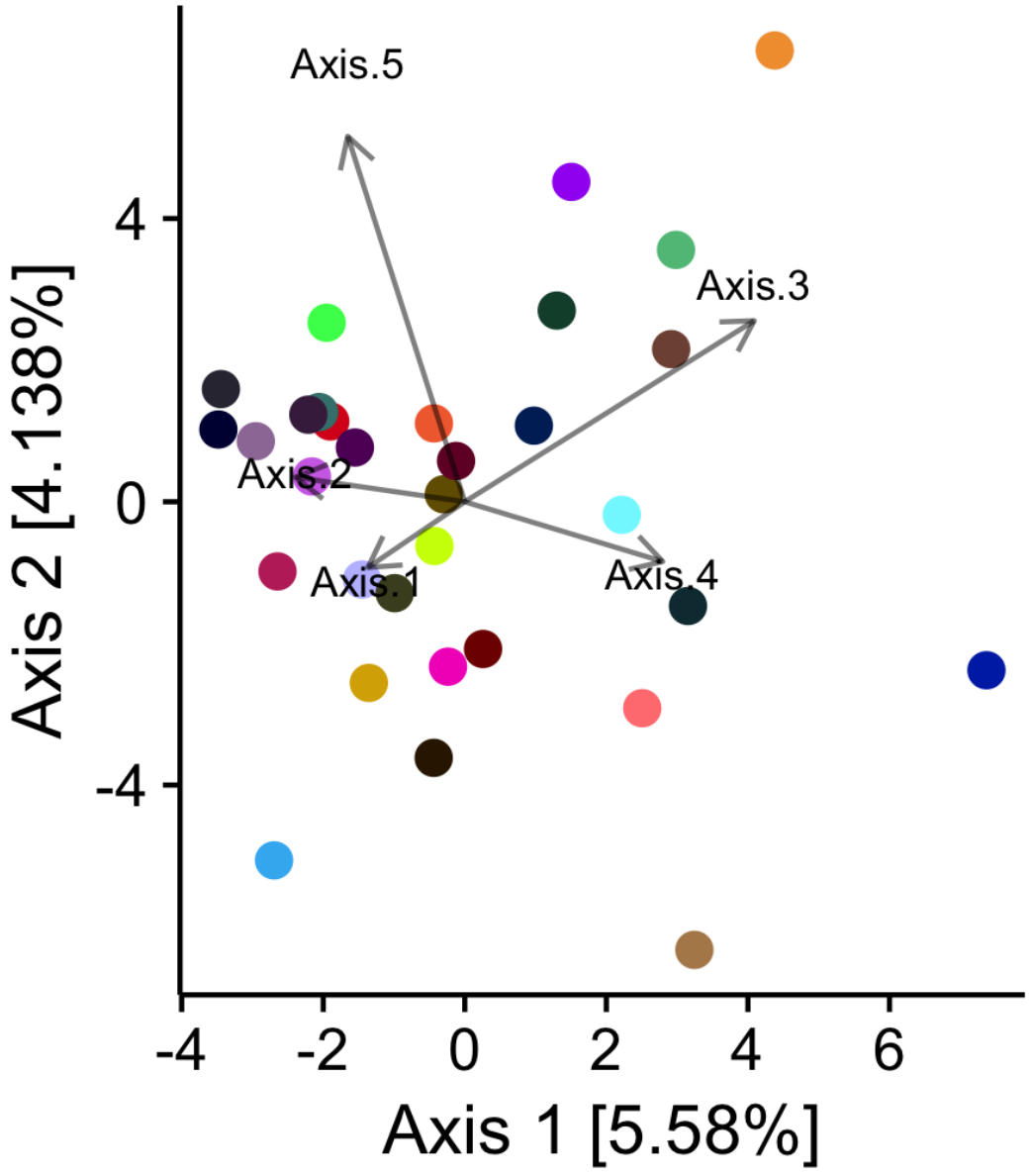
```
## tmp.14      Axis.5   0.49798316512873 3.727229e-03 2.489789e-01
## tmp.6       Axis.6  0.546089793184372 1.224202e-03 1.752358e-01
## tmp.7       Axis.6  -0.53062921297519 1.782427e-03 1.958558e-01
## tmp.10      Axis.6  0.517292611871856 2.430546e-03 2.091500e-01
```

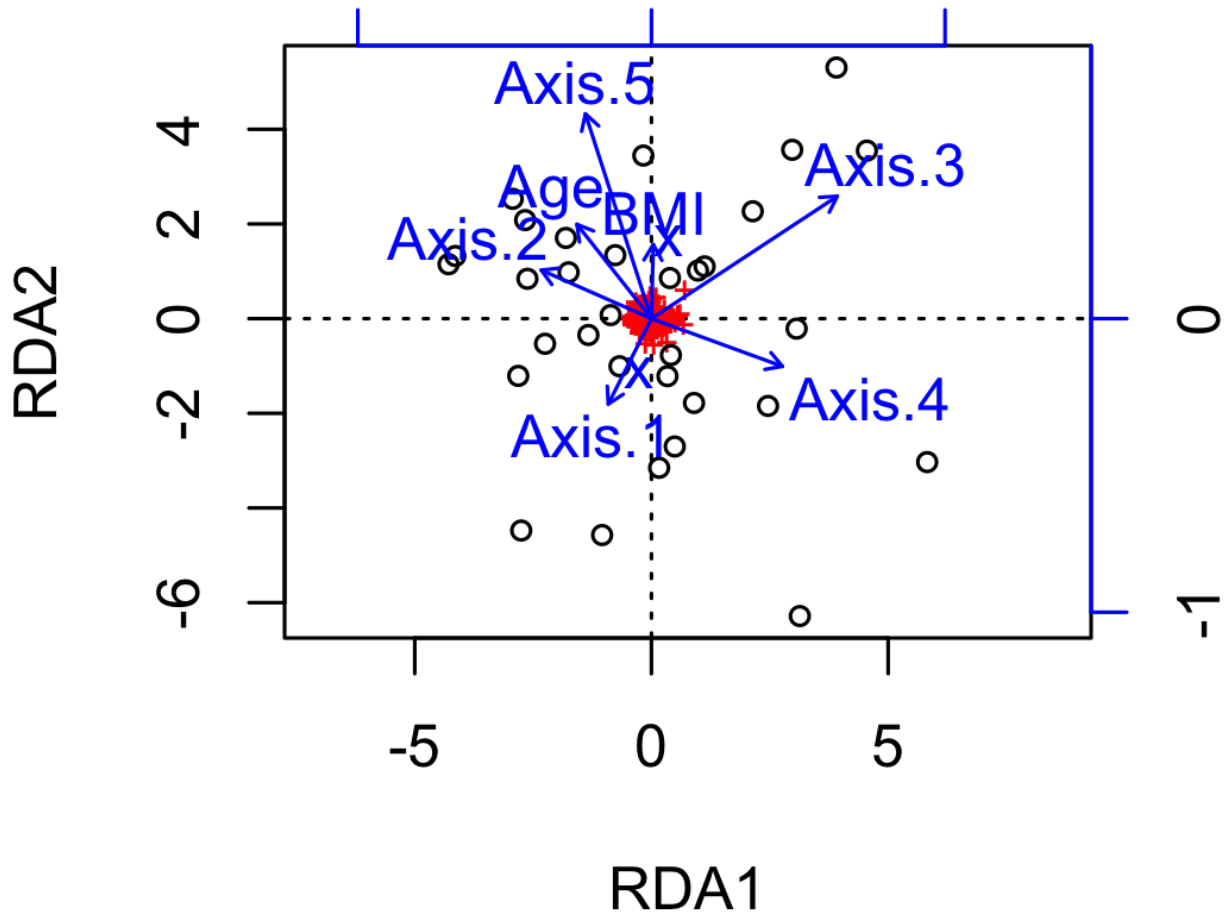
We need to look at RDA using Food Vectors to explain the variation in the taxa

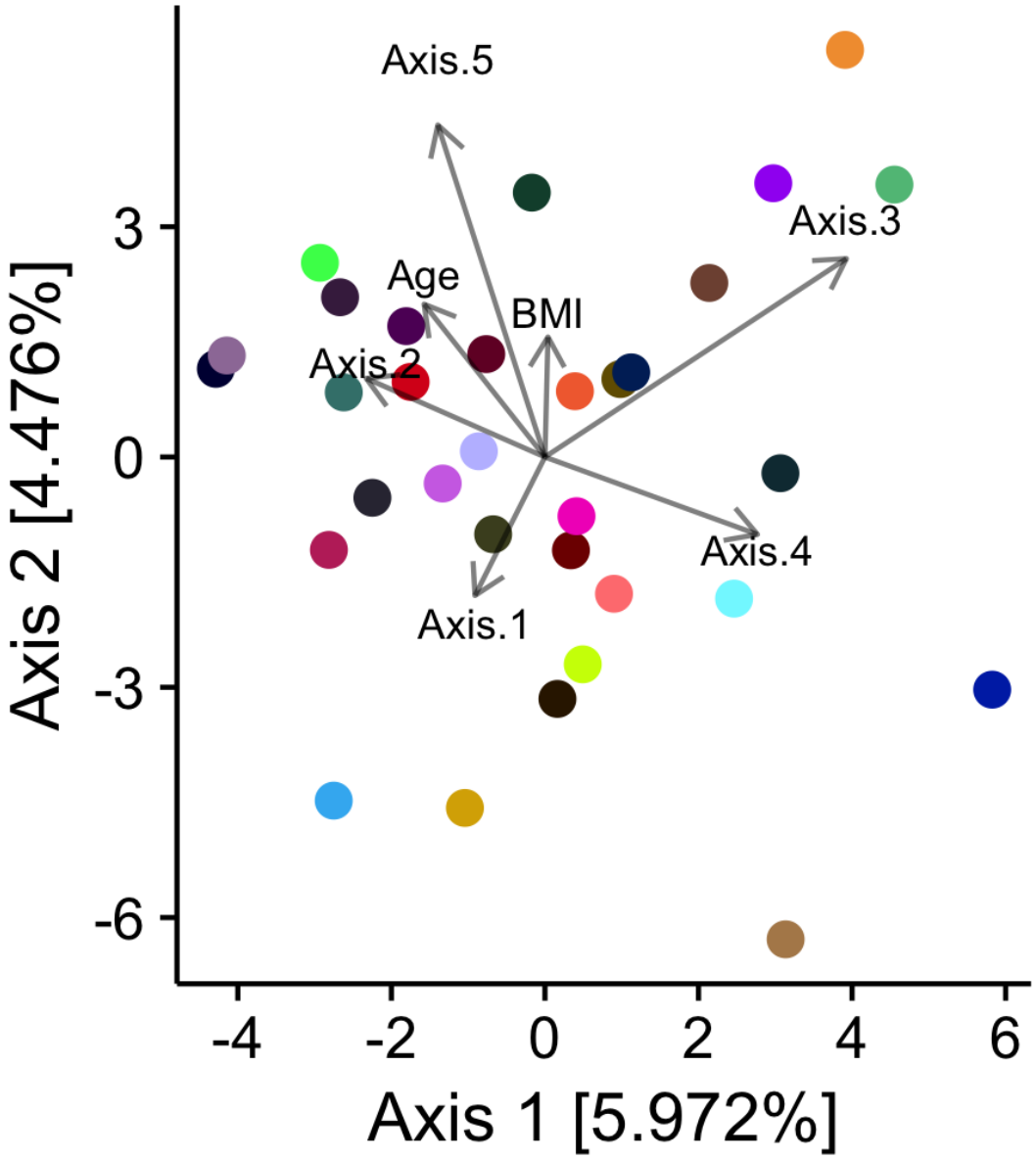


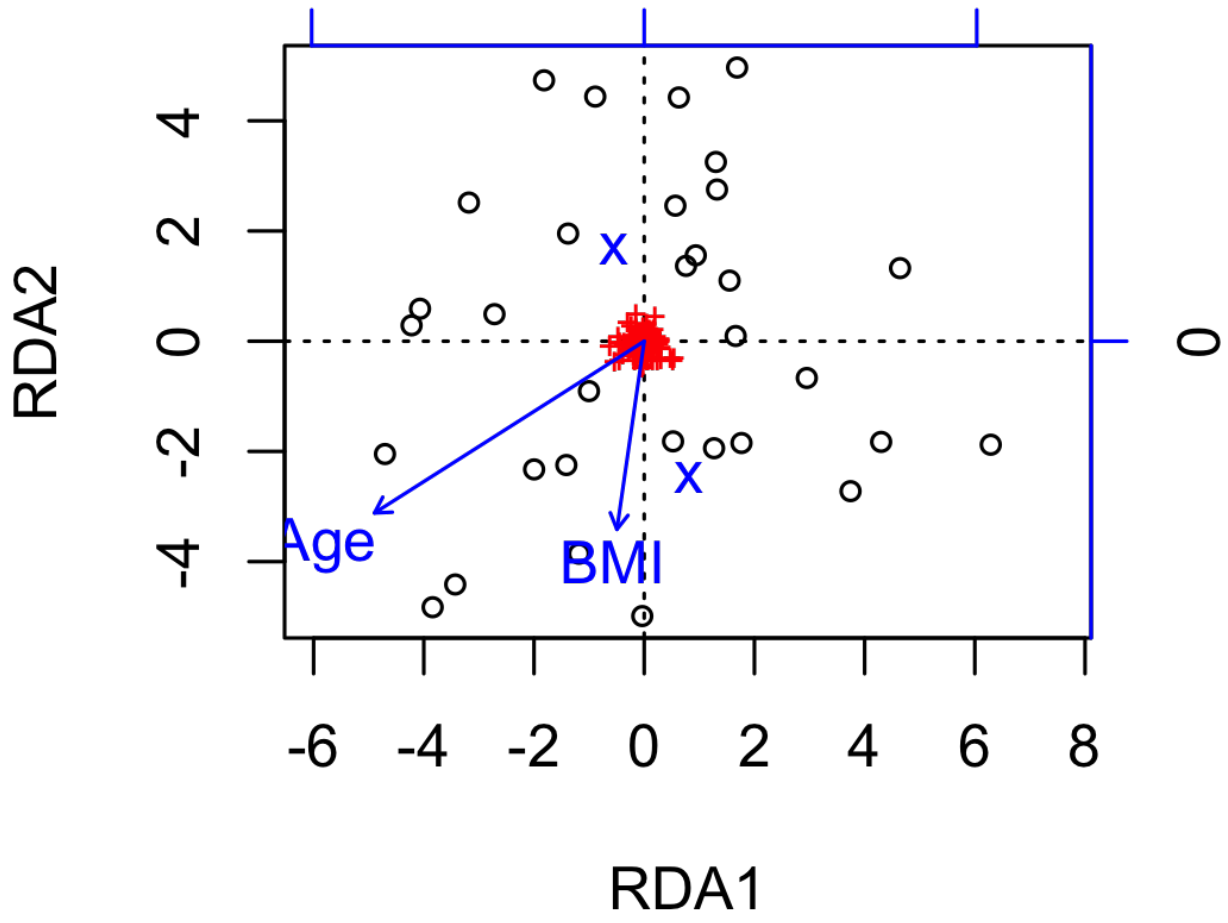

2.5
0.0
-2.5
-5.0
Axis 2 [10.03%]
-4
-2
0
2
4
Axis 1 [11.69%]

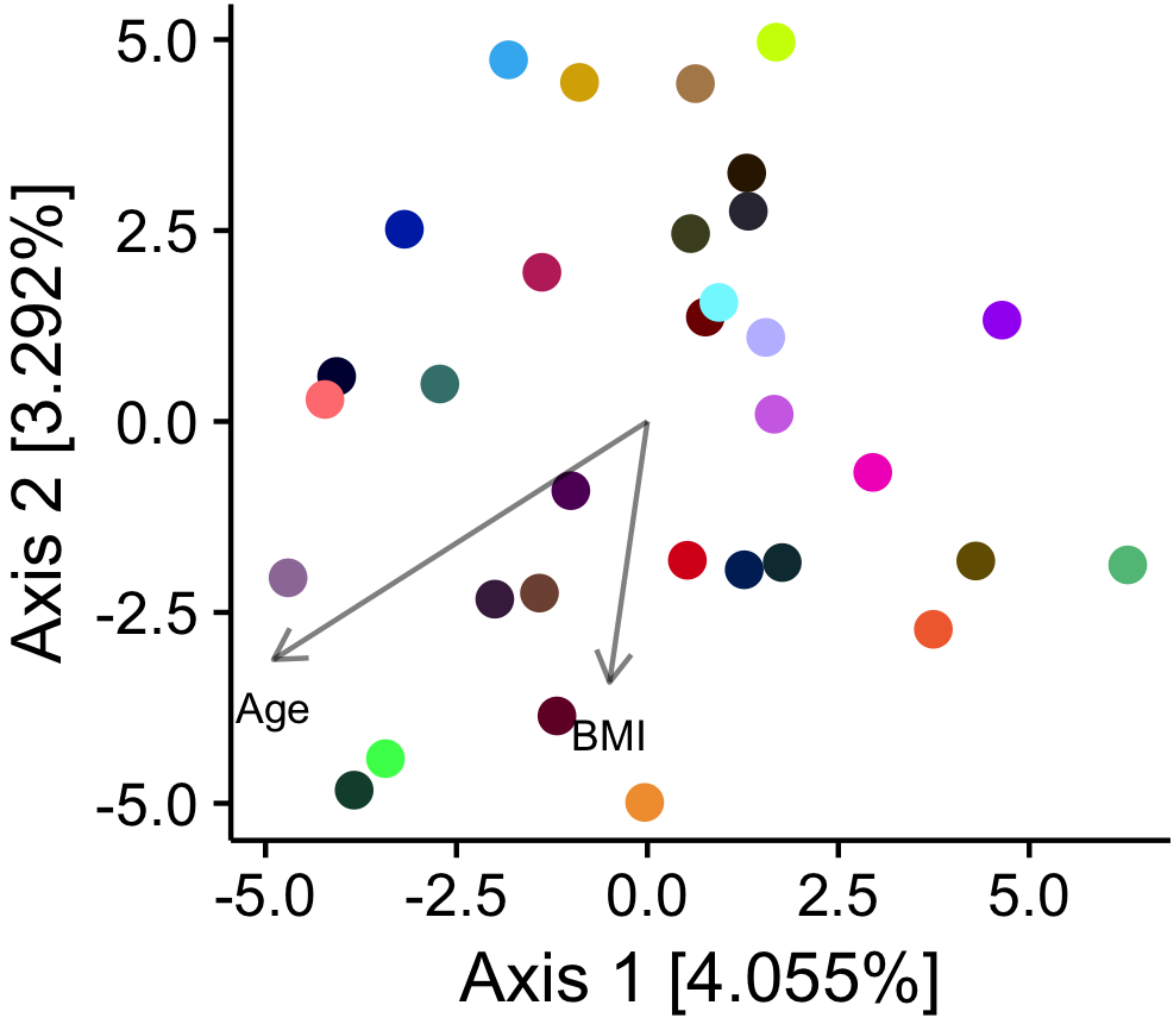

Axis.5
Axis.3
Axis.2
Axis.1
Axis.4
RDA2
RDA1
6
4
2
-2
-6
1
0
-1
-5
0
5
10


Axis.5
Axis.3
Axis.2
Axis.1
Axis.4
4
0
-4
-4
-2
0
2
4
6
Axis 2 [4.138%]
Axis 1 [5.58%]

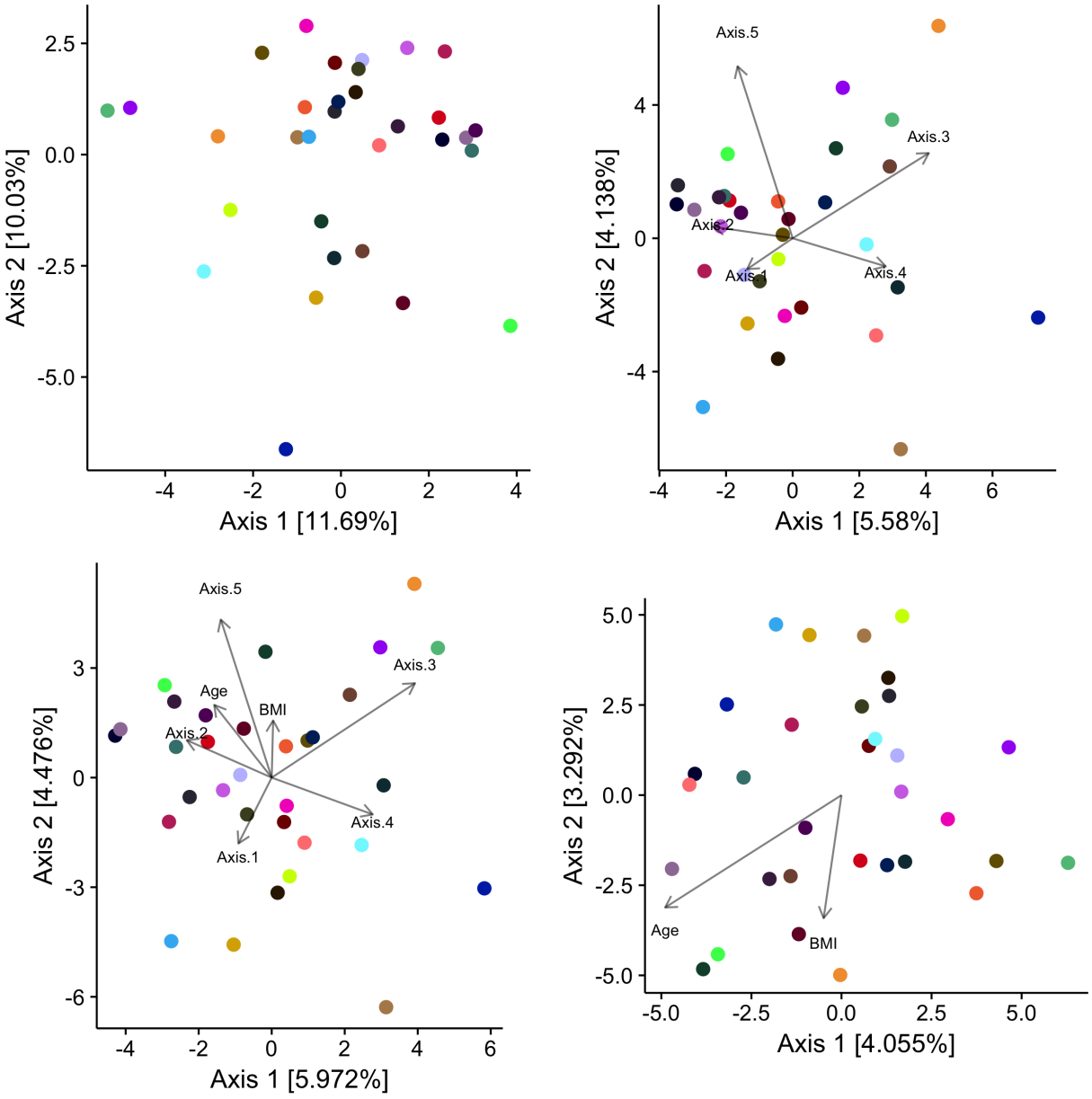

Axis.5
Axis.3
Age
BMI
Axis.2
Axis.4
Axis.1
RDA2
RDA1
4
2
0
-2
-6
0
-1
-5
0
5


Axis.5
Axis.3
Age
BMI
Axis.2
Axis.4
Axis.1
3
0
-3
-6
-4
-2
0
2
4
6
Axis 2 [4.476%]
Axis 1 [5.972%]

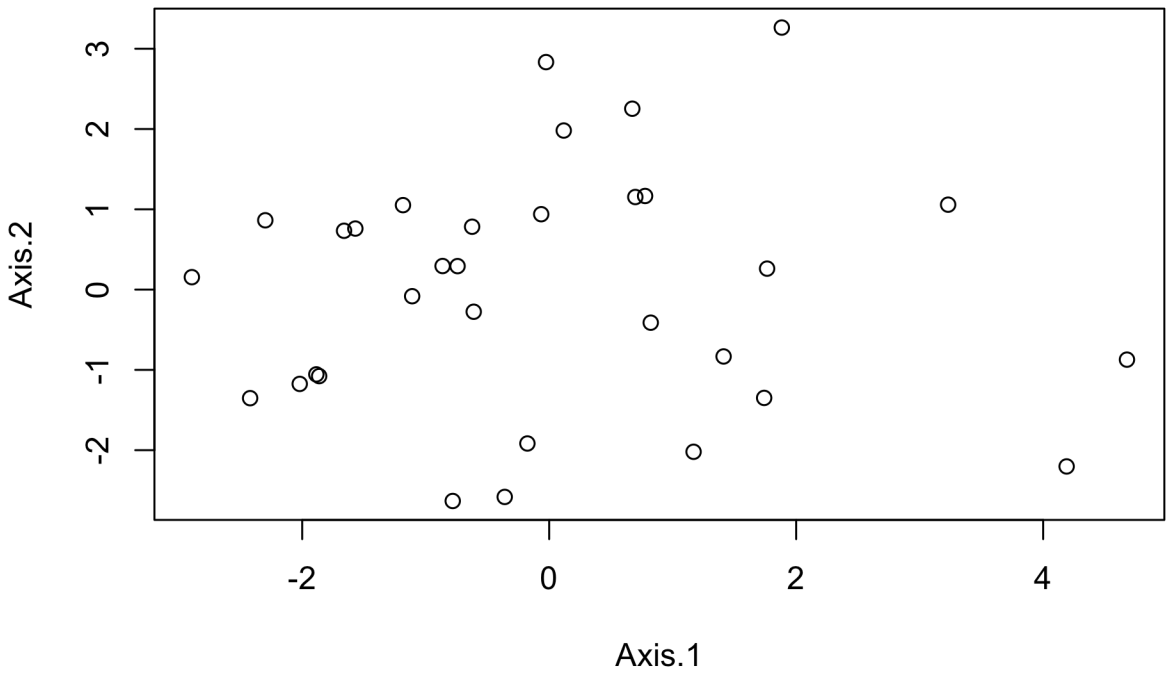

RDA2
4
2
0
-2
-4
x
x
Age
BMI
0
-6
-4
-2
0
2
4
6
8
RDA1




```
## [1] 33.82721
## [1] 48.10294
## [1] 44.7427
## [1] 3.36
```



Hypothesis, use metadata to with rda and the dietary distances - does it explain the variation?


Axis.2
3
2
1
0
-1
-2
-2
0
2
4
Axis.1