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To Eat or Not to Eat? Developing Biomarkers for Diet Selection by Herbivores

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To eat or not to eat? Developing biomarkers for diet selection by herbivores

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Background
A major goal in conservation biology is to explain habitat use by animals. Remote sensing has been used for landscape-scale analysis of habitat features. However, studies that directly link specific parameters of habitat quality to selection by wildlife are needed at the microsite-scale before landscape-scale mapping can be validated. We used the sagebrush-pygmy rabbit system (Fig. 1) to develop spectral biomarkers that can predict how the quality of food influences habitat use.

Objectives
Objective 1: Compare dietary quality of sagebrush on-mounds and off-mounds.
Objective 2: Show that high-browsed plants are higher in crude protein than low-browsed plants.
Objective 3: Develop a spectral biomarker that can predict crude protein and thus diet selection by pygmy rabbits.

Methods
• We quantified crude protein of sagebrush on- (n=27) and off-mounds (n=27) and from plants high- (n=30) and low-browsed (n=30) by pygmy rabbits.
• We then used a spectrophotometer to scan these same samples.

Plants differ within landscapes
• Crude protein was higher in sagebrush taken on-mound than off-mound (Fig. 3, P<0.0001).
• Crude protein was higher in plants highly browsed than plants less browsed by pygmy rabbits (Fig. 4, P=0.05).

Conclusions
• Variation exists: higher quality sagebrush closer to burrows
• Rabbits choose to browse plants with higher crude protein
• Preliminary spectral differences can be used to develop biomarkers
• Spectral biomarkers could provide a tool for the rapid assessment of quality food across landscapes (Fig. 6)
• Agencies armed with this tool would be able to better identify and conserve quality habitat for pygmy rabbits

Literature Cited

Each plant has a unique spectrum
• Preliminary data shows the spectra of sagebrush taken from on- and off-mounds are different at several wavelengths (Fig. 5).

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