Sage Grouse Winter Feeding Site Selection: Does Plant Chemistry Matter?

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Greater sage grouse (*Centrocercus urophasianus*) are associated with sagebrush (*Artemisia* spp.) throughout the year for both cover and food, but dietary specialization is a major reason why sage grouse survival is so closely linked to available sagebrush habitat. Sagebrush constitutes almost 100 percent of their diet during the winter. Compared to alternate winter forages (such as dried grasses), sagebrush leaves are relatively high in crude protein content. However, it is also highly defended by compounds such as the volatile oils that give sagebrush its distinctive smell. Unlike other grouse, sage grouse lack a muscular grinding gizzard, which may be an adaptation to limit the release of plant defensive compounds that are stored in glandular trichomes on the leaf surface. Unlike ruminant mammals, avian herbivores are constrained by body size and weight requirements for flight, and so lack large digestive structures to efficiently digest leaves. For sage grouse, the lack of mechanical disruption of leaves in the gizzard in addition to detoxification costs associated with plant secondary compounds may further reduce digestive efficiency. Yet, despite these challenges, sage grouse juveniles continue to grow over the winter and adults maintain body mass even in areas known for harsh conditions. The goal of this study was to determine if sage grouse were selectively feeding in winter on sagebrush plants with higher protein levels and lower levels of defensive compounds. In collaboration with a winter demography study, sage grouse hens were radio-collared in the spring and fall of 2004. Each month from October 2004 to March 2005, I randomly selected a sub-group of those hens to follow to feeding sites. At those sites and at randomly selected available sites, I recorded slope, sagebrush cover and height, and collected sagebrush leaf samples that were later analyzed for fiber, crude protein, and monoterpene content. It may be that sage grouse do so well on a strict sagebrush diet by simply choosing to feed at sites with nutritionally higher quality sagebrush.