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Effects of Nitrogen Availability on Northern Red Oak Seedling Growth in Oak and Pine Stands

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The nitrogen (N) dynamics and dry weight increment of northern red oak (*Quercus rubra* L.) seedlings in relation to N availability were examined at various levels of canopy cover treatments in red oak and red pine (*Pinus resinosa* Ait.) stands in northern Lower Michigan in U.S.A. Net N mineralization over two growing seasons following canopy cover treatments were determined by the *in situ* buried bag method. Net N mineralization rates were 1.2-2.2 times higher in the clearcut and the other partial canopy cover than in the uncut stands. Net N mineralization in the same canopy cover was 2-3 times higher in red oak stands than in red pine stands. However, red oak seedlings from the same canopy cover treatments in both stand types had similar dry weight, N concentrations, N content, and N-use efficiency despite differences in soil N availability. The only exception was 2 times greater seedling dry weight and N content in the red oak clearcuts compared to the red pine clearcuts. The similarity in seedling performance within partial canopy removal or uncut stands in both stand types may have been due to alternate N sources in the red pine stands and/or limiting factors other than N in the red oak stands. These results indicate that 1) increased available soil N increases the dry weight and N uptake by red oak seedlings when forest canopies are completely removed; 2) red oak seedling response to soil N availability resulting from no or only partial canopy removal may be the same in different stand types because factors other than N, such as light, are limiting.

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Vocal behaviour of *Oceanodroma monorhis* and *O. leucorhoa*

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Oceanodroma monorhis and *O. leucorhoa* were thought as subspecies for the similarity of the size and character. In case of these absolute nocturnal birds, vocalization would be more important than visuality. Their vocal behaviour and relationship were studied by comparing the vocal type and its role of *O. monorhis* to those of *O. leucorhoa* breeding in Korea and Japan respectively. Female and male had the same pattern of the three type calls(chatter call, purr call, and screech call), but they had different frequency and voice colour, so they could by themselves distinguish the sex from the differences. Chatter call was the important one to know the sex in darkness, especially it had the role for claiming their territory to the same sex. Purr call had meanings of making love or searching a mate. However, it showed the strong appeal against the same sex for its breeding. Screech call meant preliminary call before attack, resist, or embarrassment. The call patterns between these species were different and the react of *O. leucorhoa* at the playback call of *O. monorhis* was dissimiliar, or none. So it suggests they are not in relation to subspecies, but completely different species.