# Response of underground bud bank to degradation in a alpine meadows on the Qinghai-Tibet Plateau

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## Abstract

Exploring the diversity and formation mechanism of under-ground bud banks is essential for understanding population regeneration and community succession. However, there are few studies on the response of bud bank size and composition to different degradation gradients in alpine meadows. In view of this, we investigated the size and composition of bud bank under four degradation gradients (non-degraded:ND, lightly degraded:LD, moderately degraded:MD, and heavily degraded:HD) on a typical alpine meadow in Tibet, China, and analyzed the influence of soil physical and chemical properties on the correlation of bud bank types. Our results show that in ND meadows, rhizome buds dominate, in LD meadows, tiller buds account for a larger proportion, and in MD meadows, root-sprouting buds dominate. The total bud bank density decreases as the degradation gradient increases. The density of cyperaceae buds decreased with the degree of degradation. The density of leguminosae was insignificant in each degradation gradient. The density of gramineae and weeds were dominant in LD and MD meadows, respectively. Rhizome bud density was significantly positively correlated with soil organic carbon (SOC), total nitrogen (TN), NH+ 4- N, and NO- 3 - N ($P < 0.001$ for all), soil water content (SWC), total phosphorus (TP) and available phosphorus (AP) ($P < 0.01$), and negatively correlated with pH ($P < 0.001$). Tiller bud was significantly positively correlated with SWC and TP($P < 0.05$). Root-sprouting buds are only significantly negatively correlated with TP($P < 0.05$). Therefore, our research shows that rhizome buds are more important in ND meadow habitats, tiller buds are more important in LD meadow habitats, and root-sprouting buds are more important in MD meadows. In addition, rhizome buds have been proved to be suitable for survival in a weak acid environment.

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