How Himalayan Blackberries (*Rubus armeniacus*) Affect the Biodiversity of Native Plant Species

Madison Seneviratne
Earth and Environmental Science, EAES 2537

Abstract

Invasive species have become a problem for biodiversity worldwide. This study is designed to highlight the trends of biodiversity in relation to the invasive species *Rubus armeniacus*, the Himalayan Blackberry.

Introduction

Invasive species have adapted to out-compete and overcome native species and are therefore the leading cause of a decrease in biodiversity worldwide (Mologni et al., 2023 and Tamburello & Litt, 2023). "[British Columbia] is Canada's most biologically diverse province" (Cannings et al., 2005 as cited in Tamburello & Litt, 2023 p. 1), and with the introduction of invasive species in BC, the province is facing a significant risk of losing its said biodiversity. The Himalayan Blackberry (*Rubus armeniacus*) is an example of an invasive species found in the southwest of BC. As a species the blackberries have been able to overtake native plants with the ways they grow and reproduce. They form dense bushes which can shade the nearby plants (Thexton & Bajcz, 2021). It is dually noted that compared to native, invasive species tend to minimize the negative effects of reproducing and therefore, tend to have high reproductive and growth rates (McDowell & Turner, 2002). This prompts the question of; What negative effects does the Himalayan Blackberry have on the surrounding native plants?

One hypothesis is the Himalayan Blackberries are responsible for a decrease in the species evenness and diversity of the surrounding plants. This would suggest that if Himalayan Blackberries effect the diversity and species evenness, these factors will increase as you move along a transect further from the blackberry bush.

Figure 1: Himalayan Blackberries from this Season and Last

Methods

Sites of Himalayan Blackberries will be chosen at ecological forested edges. Transects will be set up and marked between 25 and 35m from the Himalayan Blackberries. At each distance 3 separate two square meter quadrats will be set up 5-20m apart. The total number of species, and their respectful stems will be recorded. The same data will be recorded for 0-5m from the blackberries, and directly in the bush. Then the total amount of each species will be used to provide a rank, from there a rank abundance curve will be calculated to determine the species evenness. To ensure the data is feasible, 20 sample sites will be recorded.

The methods for this project were written before any field work had taken place. Originally, due to the blackberry bushes being located on ecological edges, the same data was meant to be collected and compared from quadrats of native salmonberries. However, as the study was underway it was found that the native salmonberry grows well into the forested area in addition to along the ecological edges. Making it challenging to ensure the data being collected is 25-35m away from the salmonberries in all directions. Therefore, additional sites with Himalayan Blackberry were surveyed instead, to collect further data.

Results

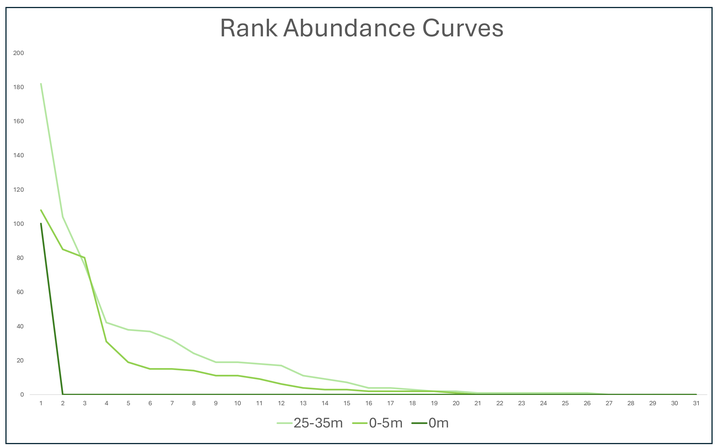

Figure 2: Rank Abundance Curves of Species Located 25-35m, 0-5m, and 0m, Respectively, from the Himalayan Blackberry Bushes

The Rank abundance Curve for the species 25-35m from the Himalayan Blackberries ranges from 182 - 0 species present and has the most gradual curve. The species 0-5m from the Himalayan Blackberries ranges from 108 - 0 and has a slightly steeper curve. Finally, the species 0m from the Himalayan Blackberry bushes have the steepest curve, going directly from 100-0. As found directly in the developed blackberry bushes, there is no biodiversity, and they contain solely Himalayan Blackberry. Based on these trends in the data it is noted that the relative Rank Abundance Curves show a correlation between the species evenness increasing with the distance away from the Himalayan Blackberries.

Discussions

The trends in the data of the Species evenness at each distance away from the Himalayan Blackberries shows that there is a potential relation to an increase in biodiversity as you move further away. These trends show there is a possibility that invasive species such as Himalayan Blackberries negatively affect the biodiversity of an area. While it is difficult, without further extensive research, to interpret whether the difference in data from 0-5m and 25-35m away comes naturally from the changes in diversity of ecological edges or is affected by the Himalayan Blackberries. It is clear in the data recorded from in the bush (0m away) there is no species evenness or biodiversity, which more evidently shows a correlation between the presence of the invasive species and a lack of biodiversity, supporting the hypothesis.

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