Budget justification:
How temporal and spatial mosaics of reproduction determine forest communities

Salaries

I request support for 1 MSc and 4-22 undergraduate students (an addition PhD student on this project is supported through base funding available to the lab). A minimum of four (4) undergraduates will be supported, up to a maximum of 22 if we have different students each summer and academic year; the lab, however, has a track record of most students staying on in the lab, which is the lab's preference as it allows students to gain more in-depth skills and follow the science from beginning to later stages. Thus we expect this will support likely 8-10 different individual students over three years.

The requested amount of $34,000 represents a base salary of $27,000 plus roughly $7,000 to cover their tuition and fees for MSc students. Undergraduate student support is requested in all years of the project to assist in field work at Mount Rainier (also called Mount Tahoma), soil pathogen studies, as well as data cleaning, management and analysis. The current minimum for a Project Worker (lowest position) is roughly $19 thus I assume $22 (as the base pay has increased roughly $2 each of the last two years). I assume this cost will be offset Work-Learn funding ($9 per hour), and other research awards (e.g. NSERC USRA, which covers currently 60% of total summer costs for one undergraduate). Thus I estimate $13 hourly rate for undergraduate students across all years.

Total costs and hours for undergraduate students: In Year 1, 4 students will work 4 weeks in the field in the summer for 4 weeks total (35 hours per week, per student) and 24 weeks in the lab for the soil pathogen study at roughly 20 hour per week on average (some weeks of prep in the summer will be higher, with lower hours each week during term when the focus will be on monitoring), for a total of 2480 undergraduate hours (4 people x 4 weeks in the field x 35 hours per week plus 4 people x 24 weeks in the lab x 20 hours on average per week) in Year 1 ($32,340). In Year 2, 4 students will again work 4 weeks in the field in the summer for 4 weeks total (35 hours per week, per student) and 24 weeks in the lab for the soil pathogen study at roughly 20 hour per week on average (some weeks of prep in the summer will be higher, with lower hours each week during term when the focus will be on monitoring), plus an additional 8 weeks (at 20 hours per week on average) to begin prep work for DNA extraction, for a total of 3120 undergraduate hours (4 people x 4 weeks in the field x 35 hours per week plus 4 people x 24 weeks in the lab x 20 hours on average per week plus 4 people x 8 weeks in the lab x 20 hours on average per week) in Year 2 ($40,560). In Year 3 (final year), 3 students will work 4 weeks in the field in the summer for 4 weeks total (35 hours per week, per student) and 32 weeks in the lab for the soil pathogen study at roughly 20 hour per week on average which will be mainly for DNA extraction, purification and quantification (which substantially reduces the costs of sequencing, while giving students additional training) for a total of 2340 undergraduate hours (3 people x 4 weeks in the field x 35 hours per week plus 3 people x 32 weeks in the lab x 20 hours on average per week) in Year 1 ($30,420).

Equipment or facility:

The lab will purchase 680 tree dendrometers and associated electronic logging systems at $42.735 per unit for a total system cost of $29,060 in Year 1 to measure tree growth at Mount Rainier. These will be installed in Year 1. In Year 3, the lab requests costs for sequencing (EZ-16S and EZ-ITS) for 500 samples from the soil pathogen studies, estimated at $103.16 per sample (this rate assumes we send extracted, purified and quantified DNA) and returns sequencing results with basic pipeline output (basic taxonomy and diversity statistics), for a total cost of $51,580 in Year 3.

Materials, Supplies & User Fees

The lab has most other major equipment needed (e.g., scales, tree corers, tree core imaging, centrifuge)

thus support is requested to cover costs associated with the soil pathogen study for supplies and minor equipment for DNA extraction, purification and quantification (we expect to have chamber fees for the soil pathogen study waived given the chambers were purchased through the lab's CFI grant recently), and related Materials and Supplies as follows:

Basic materials for soil pathogen assays including pots, soils, gloves and tubes to freeze soils is requested at $1,700 in Year 1 and slightly lower (assuming we can re-use some materials) at $1,400 in Year 2.

Materials for DNA extraction, purification and quantification including pipettes, extraction kits (current estimated costs are for Qiagen DNeasy PowerSoil kits) and various tubes and containers estimated at $10,000 in Year 2 when we will begin DNA work and $7,500 in Year 3 when we will complete DNA work and send samples for sequencing.

Travel

Travel to professional meetings
I plan to support my own conference attendance and conference attendance for MSc and PhD students (and possibly undergraduates, depending on their interests) through professional funds available at UBC and my CRC.

Travel to visit collaborators
Travel in Year 1 is focused on supporting travel to UBC for 1 member of the Plant Ecology Group, estimated at $3,000 including base airfare and housing. In Year 2, travel costs will support 1 PhD student, 1 MSc student and PI Wolkovich to visit ETH, with an estimated cost of $11,000 and for 1 member of the Plant Ecology Group to again visit UBC ($3,000). In Year 3, travel funds will support 1 PhD student and PI Wolkovich to visit ETH, with an estimated cost of $7,500 and for 1 member of the Plant Ecology Group to again visit ETH ($3,000).

Dissemination
CRC funds in the lab are expected to cover publication costs and other related dissemination.