Project Title

Project No.: **PREC10.Volder**

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Project Cooperators and Personnel:
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A. Summary

A post-doctoral scholar has started in January 2020 to write up root data from recent projects, addressing the following questions:

- When is the greatest almond fine root production (and at what depth) and how does this relate to observed aboveground growth and phenology
- How does N fertilization amount and timing affect the timing of root production (and death)
- How do irrigation and root age affect the uptake capacity of almond fine roots of different ages
- Summary of root responses to groundwater recharge projects across the Valley

B. Objectives *(300 words max.)*

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C. Annual Results and Discussion

Root, shoot, and vascular traits are tightly linked to expected survival and growth rate under drought conditions. The supply of water to and within plants is determined by soil water availability (water content and soil type), plant architectural traits (e.g., root:shoot ratio, root depth, root surface area, leaf area, tissue density), as well as axial and radial hydraulic conductance of the root system. Generally, there are tradeoffs between characteristics that confer stress resistance and those that allow a high physiological activity. We aim to study variation in root morphological, anatomical and physiological traits in response to multiple irrigation and fertilization scenarios. Processing, analyzing and summarizing root data to publication is a time consuming process. The ABC and specialty crops funded project "Development of leaf sampling and interpretation methods for Almond And Development of a nutrient budget approach to fertilizer management in Almond" finished 5 years ago, but

final publication of the root data associated with this project has stalled with the return of the graduate student assigned to this project, to his home country 4 years ago. In addition, we have considerable information about root growth patterns in response to winter recharge practices, as well as root responses to irrigation and aboveground management (PREC5).

D. Outreach Activities

1. Preliminary data has been presented at the the Almond Production short course (2016, 2019), Principles of Fruit and Nut production short course (2016 – 2019), various field days etc. to both growers, PCA's and farm advisors

E. Materials and Methods *(500 word max.)***:**

1. A qualified post-doctoral scholar was not able to start prior to January 2020

F. Publications that emerged from this work

1. Almond production manual chapter on roots (Volder and Doll, in prep)
2. Seven oral presentations at (inter)national meetings
3. Annual reports for Almond Board