Do Cover Crops Stabilize Wine Grape Productivity in a Variable Climate?
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**Introduction**

In humid, eastern climates, viticulturists must employ labor-intensive vigor reduction strategies (e.g., pruning) to control excessive grapevine vegetative growth. Undervine cover crops may reduce vigor while providing a variety of environmental benefits and services (in comparison to herbicide-maintained bare soil).

Rootstock selection likely augments cover crop effects on growth and production. Belowground examinations of cover crop and rootstock practices may provide insight into management strategies to provide resiliency in a changing climate.

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**Research Questions**

1. Compared to bare soil, do undervine cover crops:
   A) decrease shallow soil resource availability? 
   B) reduce grapevine water and nutrient status? 
   C) reduce grapevine vigor?

2. Does the influence of cover crop depend on the vigor of the rootstock?

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**Methods**

**Site and Treatments:** The study took place during the 2017 season in a Noiret (Vitis interspecific hybrid) research vineyard in central PA. Rootstock vigor (high vs low) and groundcover (bare soil vs Festuca cover crop) treatments were applied in a split plot design with rootstock as the main plot.

**Aboveground Production and Growth:**

Nutrient status of tissue

**Results**

**2017 Growing Season was cool and wet. Precipitation occurred on 49% of days between April and October (harvest).**

**Grapevine fine roots were reduced in overall length and shifted below a shallow, cover-crop root compartment (0-20 cm contained 93% of cover root mass).**

**Management practices consistently interacted to influence water availability at 30 cm: cover crop increased available water to the low vigor rootstock and decreased available water for the high vigor rootstock.**

**Conclusions**

In this humid climate study, cover crops:

- Were a viable groundcover management practice.
- Favorably restricted aboveground vegetative growth without reducing production.
- Shifted grapevine roots to a deeper soil compartment of lower nutrient content but more stable water availability.
- Interacted with rootstock practices to augment belowground water use and moderate vegetative growth.
- Influenced above and belowground responses of grape more than rootstock selection.