

FACT SHEET

National Clean Plant Network



Start clean, stay clean.

The Value of Using Clean Plants: A Review of Economic Studies

Graft-transmissible plant pathogens – viruses, viroids, phytoplasmas and bacteria – are spread through infected propagation material and can cause substantial economic loss due to lower yields, decreased product quality, and higher management costs. The best control strategy is prevention by using planting material derived from clean, foundation plant stock free of deleterious pathogens.

The National Clean Plant Network (NCPN) centers and programs screen plant materials for selected pathogens, eliminate those pathogens, and produce, maintain and distribute pathogen-tested plant materials. Currently, the crops covered by NCPN centers include fruit trees, grapes, berries, citrus, hops, sweetpotatoes, and roses. How important is the production and use of clean foundation stocks for profitability of these specialty crops? Existing studies and knowledge gaps are identified to determine the future direction of NCPN efforts.

Starting with clean plants provides higher yields, better quality and greater profits.



Virus-infected strawberry (left) compared to healthy strawberry (right). Infection with strawberry viruses can cause a yield reduction of up to 30%. In some cases total crop failure occurs.

Economic Loss Due to Disease

Economic studies for citrus, grapes and fruit trees estimate the following economic losses due to diseases of concern:



A vineyard in Napa Valley, California that was removed due to virus disease. If grapevine red blotch disease incidence is high (over 30% infected), full vineyard replacement is recommended.

- In citrus in Florida, \$4.51 billion from citrus greening over 4 years.
- In winegrapes in New York, \$10,000-\$16,000/acre from grapevine leafroll disease in New York state over the life of a vineyard.
- In winegrapes in California Northern San Joaquin Valley, \$12,000/acre from grapevine leafroll disease over the life of the vineyard.
- In winegrapes in California Napa County, \$91,660/acre from grapevine leafroll disease over the life of the vineyard.
- In fruit trees in Pennsylvania, \$30 million to growers over 10 years to eradicate plum pox virus.

Economic Value of Clean Plants and Clean Plant Programs

Studies have estimated the economic returns on using clean plant materials derived from pathogen-tested foundation stocks and on supporting clean plant centers and programs. Some of the benefits are listed below:

- In the Pacific Northwest, tree fruit grower returns using certification programs were estimated to be \$2.6 billion over a 20-year period.

- The value of using virus-tested materials to the winegrape growers in California North Coast region was calculated to be \$22.5 million annually, which substantially outweighed the cost of the clean plant program at Foundation Plant Services in Davis, CA by at least ten times.
- An analysis of producing virus-tested grapevines in California and New York revealed a benefit-to-cost ratio of 117 over 10 years for Foundation Plant Services in Davis, CA and 7.2 for the younger NCPN-Grapes center at Cornell University in Geneva, New York.

Future Research



Clean citrus nursery plants growing in a greenhouse.
Photo credit: Four Winds Growers

- Economic studies are needed for the NCPN specialty crops that have not been well studied thus far, including berries, hops, roses, and sweetpotatoes.
- Additional economic studies are needed to examine the more complex questions about disease management using planting material derived from pathogen-tested foundation stocks under different scenarios.
- Economic studies are needed to assess the value of clean plant materials

to nurseries in order to encourage adoption and maintenance of certified, clean plant materials needed by commercial producers.

- While the cost-benefits of some NCPN centers have been studied, the cost-benefits of many NCPN centers have not. Economic assessments of those centers not studied yet are needed to ensure continued support and funding from industry and government.
- Studies are needed to identify the economic impact of specific diseases so that resources can be effectively allocated to mitigate their impacts.
- More and better data are needed about the production impacts of graft-transmissible plant

pathogens in order to analyze the cost benefits of clean stock.

- Studies are needed to evaluate how disease management actions of neighboring growers might increase or decrease the incentive of growers to buy planting material derived from pathogen-tested stocks.
- Analyses of socioeconomic factors that drive market dynamics and growers' preferences and actions in terms of the adoption of clean planting material.



Clean sweetpotato plants boxed for grower pickup.

A Strong Case

A review of the literature found that economic studies on NCPN crops were limited and that better production data are needed to support future economic studies. The studies that do exist clearly show great economic benefits to using clean plants. These benefits include increased production, increased product quality and decreased production costs. Benefits have been found at the producer level that can accrue to the industry and consumer levels. The benefits of an NCPN center were also demonstrated, providing a strong case for continued public and private investments in support of the production and distribution of clean, pathogen-tested materials.

Economics Special Initiative: Stakeholders, economists, clean plant center directors, and NCPN program managers convened at Cornell University in 2019 to discuss existing clean plant economic studies and determine areas for future development. Read the full report developed under this initiative at: <https://ucanr.edu/sites/natcpn/files/320561.pdf>.



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April 2020