

Ecological viticulture Promise of agroecology

BY Dr. Andrew Lorand

Growing fine grapes for world-class wines goes beyond having the "right" rootstock or the right trellis system. Increasingly, winegrowers want to bring the soil to expression, attend to the environment, and care for our communities. As a result, viticulture and enology have become more than just agricultural and food sciences. In recent years, they have been cross-fertilized by the ecological and social sciences as well as by traditional and alternative farming systems.

A new, comprehensive approach is emerging, which we can call "ecological viticulture." Ecological viticulture, generally defined, is the attempt to maximally harmonize vineyard management with Mother Nature so as to a) restore ecological health, b) produce the highest quality grapes that are as expressive of unique sites as possible, and c) create the most positive impact economically, environmentally, and socially.

Agroecology is one of several sub-systems of environmentally effective and socially conscious farming systems being tested and adapted into ecological viticulture. Others include organic farming, permaculture, and biodynamics. The term "ecological viticulture" is an umbrella term for all of these alternative farming systems applied to grapegrowing.

Exploring innovation

As a combination of agriculture and ecology, agroecology has devel-

oped key innovations over the last several decades, forming them into the science of sustainable farming systems. It is already revolutionizing the way scientists and farmers think about agriculture.

The centerpiece of agroecology is the understanding of a farm or even simply a crop field as an ecological system. Thus, key ecological phenomena, such as soil fertility (including nutrient and water availability, humification, mineralization, etc.), biodiversity (species diversification, competition, succession), and disease/pest/weed management (predator/pest interactions, immunity, resistance) are studied carefully *and* in relationship to one another in order to analyze their interactions.

As in any living system, the elements and principles that make up the ecological system in our vineyards are complex, integrated, and often subtle. All of them affect one another throughout the season.

The comparative advantage to this ecological whole-systems approach (versus seeing vineyard components as separate and not necessarily connected) is that one gets a much truer picture of what a crop actually faces in the course of its life. Additionally, one is less likely to miss subtle or long-term ecological problems or unintended consequences.

Perhaps most important, one gets the benefit of planning, managing, and reviewing with multiple, coordinated perspectives. Farming without the advantage of agroecological principles and practices is a bit like driving without any side or rear-view mirrors. It

can be done, but we are more limited than we need be.

Is it practical?

A key to understanding agroecology is in appreciating its attempt to restore and enhance the natural "dynamic equilibrium" of a vineyard. Dynamic equilibrium is a term used to describe the ability of a given piece of land or a bioregion (or a plant or an animal) to restore itself to health in the face of ever-present challenges (including those brought on by production pressures). In other words, it wants to restore the natural health of the land (natural resistance, immunity, restorative capacity) as much as possible using ecological methods.

Learning to understand dynamic equilibrium means learning about the agro-ecosystem's health components. These are part of the overall production equation that includes *terroir*, climate, management, etc. Understanding and tracking these components helps us answer the all-important production question: What impact will any given act or omission have on the health (dynamic equilibrium), productivity, and quality of a vineyard?

Agroecology supports vineyard health, productivity, and quality using several key principles which promote:

a. **Soil fertility** (such as increasing stable humus, protecting against erosion, recycling/reusing biomass, optimizing nutrient and moisture availability, protecting indigenous micro and macro fauna and flora).

b. **Biodiversity** (such as enhancing diverse biotic activity in the soil, increasing diversity of beneficial plant and animal life, enhancing biological interactions between beneficial insects, plants, and animals).

c. **Pest prevention** (such as strengthening a vineyard through choosing healthy plants to begin with, enhancing natural immunity and resistance of vines to diseases and pests, avoiding known pest hosts, increasing levels of natural predators of pests, using natural pesticides).

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d. **Appropriate production** (such as planting well-adapted species, rootstocks and varieties, adopting a production system best suited for the site's ecology, adjusting expectations to the vineyard's long-term ecological capacity).

Practically speaking, these principles lead to such practices as composting, cover cropping, crop rotation, mulching, the use of biological foliar sprays (such as compost teas), poly-cultures, insectaries, and non-invasive domestic and wild animal integration.

The menu for the practitioner includes long-term investments and programs because ecological health is a long-range goal. Many growers are already using one or more of these agroecological practices, yet without a comprehensive, systematic approach, they are depriving themselves of the full benefits of the whole system.

Research-based and effective

Currently agroecological research is being carried out in viticultural regions around the world. One of the forums for such work is IFOAM (The International Federation of Organic Agricultural Movements), which holds a bi-annual International Congress on Organic Viticulture. I attended the 2000 congress in Basel, Switzerland, and found it helpful. The most recent one was in August 2002 in Victoria, B.C. (see www.cog.ca/ifoam2002).

In Basel, several presentations examined aspects of agroecology and viticulture. An example: "Plant Biodiversity and Biological Control of Insect Pests in a Northern California Organic Vineyard" by Nicholls and Miguel Altieri. Altieri is a professor at UC Berkeley and one of the better-known representatives of modern agroecology. He has written a book and several significant papers on the subject. See: <http://www.cnr.berkeley.edu/~agroeco3>.

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Agroecological research is also being carried out on a variety of crops and cropping systems at various universities around the U.S. and the world. Such topics as compost teas, beneficial insects, and soil fertility programs are often at the top of their research agendas. In many, if not most cases, strong benefits of agroecological practices are being demonstrated. See: www.umass.edu/umext/programs/agro/, www.aces.uiuc.edu/~asap, www.gwdg.de/~uaoe/, www.wirs.aber.ac.uk/research/organic.shtml as examples.

Agroecology is a serious framework for innovation in viticulture. In the end, creative innovation carries the day. Naturally, the proof is all in the pudding — or in the field and in the bottle in the case of grapegrowing.

In upcoming articles, I will explore in depth various key agroecological sub-topics, and I will also

reference specific research projects and papers. I will also describe various how-to's of agroecology's specific practices, and explain what I can about their effectiveness, costs, and applicability. ■

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