# Quantum⇨Thinking

Purple photosynthetic bacteria (primarily *Rhodopseudomonas palustris*) likely do not survive the acidic nature of Effective Microorganism (EM) mother culture over an extended period of time. Manufacturers undoubtedly put such into probiotic products as claimed but this critical component isn't necessarily found on the grower's end. In a nutshell, photosynthetic bacteria do not form endospores (single cell reproductive bodies) to enter a dormant state at high acidity but rather are "vegetative bacteria" that can only remain viable in a living consortium. The surer means of orchard application is direct introduction of photosynthetic bacteria in the spray tank on the day of spraying.

Quantum Growth is a shelf stable consortium of purple photosynthetic bacteria. These vegetative bacteria harvest radiant energy and store the acquired energy in chemical form as adenosine triphosphate (ATP). This process, known as photosynthesis, is essential to life as it provides energy for both producers and consumers. These bacteria serve as the first trophic layer in the arboreal food web, providing carbohydrate resources to all other microbes in the arboreal community and thus the plant. This happens when the sun shines but also at all frequencies within the electromagnetic spectrum. Such complexities lie in the vegetative nature of all photosynthetic bacteria, which in truth, are the endosymbiotic drivers behind the chloroplasts and mitochondria in green leaves. Incredibly cool stuff!

The fatty acid diet and other complex hydrocarbons found in fish hydrolysate, unadulterated seed oils, and seaweed provided in a holistic approach to orcharding prolongs surface populations. Such "deep nutrition" boosts the reproduction capabilities of purple photosynthetic bacteria populations as well, thereby keeping the arboreal microbe engine humming longer between spray applications. Humic and fulvic acid products are an additional primary foodstuff to consider using.

Obviously growers need to keep the competitive colonization component of the holistic core recipe economical. SCD's ProBio Ag mother culture contains the essential lactobacilli and yeasts found in quality EM but with significantly less of the photosynthetic component. The ProBio Ag cost ($135 plus shipping) is half that of ProBio Original ($270 plus shipping) which includes the purported purple photosynthetic bacteria. Terraganix's EM-1 sells for $290 for the same 5-gallon quantity, only now with shipping included. Activation of mother culture results in an increase of 22x by volume thus making upfront costs far less of a deal breaker.

Quantum products are available from Rocky Mountain BioAg. The cost for each of the three formulations is $55.95 per gallon, based on six pack delivery, shipping included. Purchase of a 30 gallon container lessens the cost per gallon to $38, plus freight delivery. Quantum Total includes greater numbers of purple photosynthetic bacteria plus a long list of beneficial companions. Population counts in the jug are guaranteed for three years unopened, dropping to one year once opened. Brewing (activating) the

Quantum formulation falls short as vegetative bacteria do not respond as positively to a molasses feed like the other facultative microorganisms in EM.

What follows for recommendations for pome fruits are given per acre. Stone fruits are treated similarly, only bud stages come sooner than apple and thus the terminology shifts. Every holistic application includes two gallons of activated EM per hundred gallons of spray. Introducing Quantum products when tank mixing assures that viable photosynthetic bacteria are part of the mix with lactobacilli and surface yeasts.

Use of any synthetic products negates microbial benefits.
Copper will impact populations adversely for a week or more.

| **Traditional Timing** | **Holistic Application** | **Rocky Mountain BioAg recs** | **Michael Inclinations** | **The Fiscal Squeeze** |
|---|---|---|---|---|
| Tight cluster | Spring1 | 128 oz | 64 oz | 32 oz |
| Pink | Spring2 | 128 oz | 128 oz | 64 oz |
| Petal Fall | Spring3 | 64 oz | 64 oz | 64 oz |
| First Cover | Spring4 | 64 oz | ð | ð |
| 2nd Cover | Comp1 | ð | 64 oz | 32 oz |
| 3rd Cover | Comp2 | 64 oz | ð | ð |
| 4th Cover | Comp3 | ð | 32 oz | 32 oz |
| 5th Cover | Summer1 | 64 oz | ð | ð |
| 6th Cover | Summer2 | 64 oz | 32 oz | 32 oz |
| 7th Cover | Summer3 | 64 oz | ð | ð |
| 8th Cover | Summer4 | 64 oz | ð | ð |
| **Total Quantity** | | 5.5 gallons | 3 gallons | 2 gallons |
| **Cost per Acre** | | $308 | $168 | $112 |

NOTES ON SPRAY FREQUENCY:

- Emphasis is on canopy establishment early on, followed by first cover sprays at 7 to 10 day intervals following fruit set. These spread to 14 days apart in summer.
- Surface area of canopy at tight cluster is relatively small thus a prime opportunity to reduce upfront manufacturer recommendation.
- First cover in holistic plan (Spring4) occurs 5 to 7 days after petal fall application.
- Rocky Mountain BioAg recs settle into a 14 day pattern from fruit set on.
- Keep in mind, the holistic plan prolongs organism viability across the board with fatty acids and complex hydrocarbons.