AQUEOUS CYANAMIDE, ANOTHER NEW TOOL TO ENHANCE USE OF "STARVE & SWITCH"

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Aqueous cyanamide (HyCyn) added uniformly to abundant volumes of water being delivered around existing trees and vines or soon to be planted trees and vines can devastate nematode populations and associated replant problems within the soil zone receiving the water. A month after drenching to live plants its systemic qualities are observable. Plant uptake provides kill of endoparasitic nematodes within and around roots based on volume of water during delivery. Within two months after treatment its devastating root killing ability is competitive with soil fumigation. It is a quicker root killer than glyphosate or triclopyr applied to cut stumps. Best performance against the replant problem, weed seeds and associated nematodes is achieved in soils warmer than 60F. In California this commonly means May 1 to November15. This biocide is: non-odorous, non-fuming, highly soluble with short half-life and a relatively low Henry's Constant. It does not just kill existing plants but provides a useful startup for rotation crops and the replants.

PRODUCT DELIVERY

Growers of perennial crops will prefer a pesticide category III formulation (10% ai). Three decades ago a category II formulation (50% ai) came into commercial use as a plant growth regulator to perennials outside or within glass houses. It is only now about to be submitted for registration as a biocide delivered into soil. Upon approval, growers of perennials will be delivering the ai as a spot or strip drench. Basin applications or chemigation via drip will be the preferred methodology. Delivery of small water droplets via fan jets or high pressure will be avoided. This product may not need to be applied to existing plants if plant spacings will be changed. However, if the target includes endoparasitic life stages eg. *Pratylenchus vulnus* its lack of fuming is associated with poor penetration of already dead or decomposing roots.

SWITCHING ROOTSTOCKS

1/ **Walnut** orchards with the new vigorous VX211 clonal paradox rootstock (*Juglans regia x J. hindsii*) following NCB (*Juglans hindsii*) will be planted at 35 to 62 tree sites/acre. In loam soils each tree site will receive up to 400 gallons water at 1500ppm HyCyn ai. 2/ **Almond** orchards commonly support 105 trees/acre with water delivery of 300gallons/site at 1500ppm ai. We will usually replant after Nemaguard (*Prunus persica*) rootstock with Hanson 536 (*Prunus*

amygdalus cv Titan *x Prunus persica* cv Okinawa) 3/ In a **Prune** orchard on coarse sandy loam soil and 200 trees/acre (*Prunus cerasiferae* cv Marianna 2624), Bacterial Canker, Phytophthora spp, *Pratylenchus vulnus* and *Mesocriconema xenoplax* are all present. We will drench 200 gallons of water/site then replant at appropriate times with 1-yr old clones of HBOK1 rootstock (*Prunus persica* cvs Harrow Blood x Okinawa) offering mechanisms of resistance to *Meloidogyne* spp and tolerance to *Mesocriconema xenoplax*. HBOK1 when following Marianna 2624 is susceptible to root rejection. 4/ A **Vineyard** at 6 x 12-foot spacing supports 605 vines/acre. We will drench existing plants to a depth of 4 feet and zone 3-4 feet wide delivering a total of 45 gallons water per vine in loamy sand at 1250ppm HyCyn ai. This will be followed by replanting at the appropriate time 10-17A rootstock (*Vitis simpsoni* x Edna) which offers unparalleled broad nematode resistance, great relief from the rejection component of the replant problem but no tolerance to Grapevine Fan Leaf Virus which in this site is not present.

TOTAL N MATERIAL BALANCE

The walnut replant scenario with 35 to 62 trees/ac treated with 400gal water at 1500ppm HyCyn results in 124lb to 221lb total N/acre. The almond replant scenario with 105 trees, each treated with 300 gal at 1500ppm HyCyn results in 279 lb N/Acre. The prune replant scenario with 200 tree sites/acre, each receiving 200gal water at 1500ppm HyCyn results in 354lbN/Ac. The raisin scenario with 605 vines/ac, each treated with 45 gallons water at 1250ppm HyCyn results in 200lb total N/Ac. Crop rotation using 'nematode safe' winter or summer crops including winter barley or wheat and spring Sudan grass, silage or millet should occur before replanting. We also need to determine the Total N uptake value for established perennials plus the year-old replants.

BULLET POINTS

Herein is our first report on HyCyn to protect and expand use of "S & S" tactics.

1/Use it to provide early (1.5 yr) root protection for plant resistance mechanisms.

2/Use it to possibly reduce by a half year the 1 full year of waiting time with "S & S".

3/Use it because starving the ecosystem is passive over time but HyCyn is active.

4/Use it whether trees are alive or missing.

5/Use it to control existing weeds and their seeds.

6/Use it because its entire contents can be metabolized and re-used.

7/Use it because it offers protection for rootstocks lacking one or two resistance mechanisms.