

Managing Fruit Flies for Sour Rot in 2019

Greg Loeb and Hans Walter-Peterson



As many wine growers are aware, 2018 was a bad year for sour rot. A number of factors probably contributed to this but one factor that was clearly involved at one vineyard site in the Finger Lakes was failure of insecticides (particularly Mustang Maxx) to control *Drosophila* fruit flies. As we have reported previously, fruit flies (also called vinegar flies) significantly contribute to sour rot through mechanisms we do not fully understand. Nevertheless, insecticides targeting them prior to harvest (after about 15 Brix), coupled with biocides such as Oxidate targeting contributing microbes, have been shown to

reduce the incidence and severity of sour rot. Several species of fruit flies probably contribute to the problem. Our research has actually indicated that *Drosophila melanogaster* (the common fruit fly of genetics fame often found in kitchens in the summer) is more commonly found in grapes than the invasive spotted wing drosophila, *Drosophila suzukii*, though both species likely contribute to our sour rot problems. Wine growers have increasingly been applying insecticides near harvest as part of their sour rot management program, primarily relying on the pyrethroid insecticide, Mustang Maxx. Recently, working with our Cornell colleague Dr. Jeffrey Scott, we have shown that a local population of *D. melanogaster* has developed resistance to Mustang Maxx, as well as Assail, a neonicotinoid, and malathion, an organophosphate. The population is still susceptible to spinosyn (Delegate or Entrust). We have not detected evidence of insecticide resistance for spotted wing drosophila in New York, however. We do not know how wide spread this *D. melanogaster* resistance issue is but we should have a better idea after this field season. In the meantime, we want to emphasize the need to rotate among several different classes of insecticides in order to slow the development of resistance. Mustang Maxx has several attributes that make it a logical choice for many growers including good efficacy against fruit flies and importantly, a short days to harvest (DTH) restriction of 1 day. Despite these advantages, **it is essential, as part of a resistance management program, to rotate to other classes of insecticides.**

Here we want to review the chemical control options available for controlling *Drosophila* fruit flies to aid in developing your sour rot control program. Below is a table of the products currently labeled for use against either *Drosophila* fruit flies or specifically for spotted wing drosophila, including materials added through 2ee label exemptions. We provide the product name, chemical name, insecticide class (IRAC number), days to harvest restrictions and other notes. We do not recommend initiating your chemical control program until grapes reach about 15 Brix. Prior to this, it's not likely that many fruit flies will be present in your vineyard. We caution you to be conservative with sprays. For example, some cultivars with loose clusters such as Cab Franc and Lemberger, are not particularly susceptible to sour rot. Cultivars with tight clusters, such as Riesling and Vignoles, are more prone to sour rot issues. Also, be aware of other factors contributing to sour rot risk. For example, if the weather leading up to harvest is conducive to sour rot development (e.g. wet and warm conditions) be more diligent with your sprays, but if conditions are not conducive to sour rot, consider reducing sprays at least for cultivars that are not especially susceptible. Another important factor is minimizing berry damage from birds and direct insect pests such as grape berry moth as much as possible.

Some additional comments about insecticides. For insecticides listed in the table below that are allowed through 2ee exemption, make sure to have the exemption in your possession. You can download these

from the NYS DEC PIMS web site (<http://www.dec.ny.gov/nyspad/products>). Note that some insecticide labels list *Drosophila* species or fruit flies generally. Others only list spotted wing drosophila. In the later situation, legally you must be targeting spotted wing drosophila. We have limited information on how frequently insecticides and biocides should be applied. Our initial studies started sprays at about 15 Brix and continued on a weekly basis until near harvest. We suspect we can reduce the number of sprays without loss of efficacy but we don't have enough data yet to make specific recommendations. Unless you believe you had a control failure the previous year associated with application of Mustang Maxx, it should be ok to use in your rotation. We suggest using at least three different classes of insecticides (different modes of action, e.g. different IRAC classes) in a season, taking into consideration efficacy, days to harvest restrictions and other restrictions such as total amount of active ingredient (A.I.) allowed and insecticides applied in your vineyard targeting other pests. For example, Delegate (a spinosyn) is considered a very good material against spotted wing drosophila but it has a 7 DTH restriction. There are also limitations to the total amount of A.I. allowed in a season and you also must rotate to a new class after two successive sprays.

Finally, please let us know if you have observed what appears to be a control failure for an insecticide application targeting fruit flies. An indication of a control failure would be observing numerous healthy-looking adult fruit flies in the vineyard block immediately or shortly after an insecticide application. Some adults might be expected with continual emergence, but populations should be noticeably lower.

Table 1. List of insecticides for use against *Drosophila* fruit flies (vinegar flies) labeled in New York including trade and common names, IRAC (Insecticide Resistance Action Committee) chemical class based on mode of action, days to harvest restriction and other information. Also see the NY and PA grape guidelines for additional information.

Product name	EPA Number	IRAC Code	2(ee) required? ^a	Rate	REI (hrs)	PHI (days)	Reapplication interval (days) ^b	Max applications per season	Maximum product applied per season	Comments
Assail 30SG	8033-36-70506	4A	Yes	4.5-5.3 oz/acre	12	3	14	2	10.6 oz	2ee required for SWD. Good but not great efficacy. Do not use an adjuvant.
Danitol 2.4 EC	59639-35	3A	No	11-21 fl oz/acre	24	21	7	2	42 fl oz	'Vinegar flies' and SWD listed on the label.
Delegate WG	62719-541	5	No	3-5 oz/acre	4	7	4	5	19.5 oz	SWD is listed on recent label. Older labels may not include SWD. No more than 2 consecutive applications of Group 5 materials.
Entrust SC	62719-621	5	Yes	4-8 fl oz/acre	4	7	5	5	23 fl oz	2ee required for SWD. OMRI listed. No more than 2 consecutive applications of Group 5 materials.
Grandevo WDG	84059-27	NA	No	2-3 lbs/acre	4	0	NA	NA	NA	Based on entopathogenic bacteria. Labeled for fruit flies. Organic. Modest efficacy but potential rotation option with Entrust SC for organic growers.
Malathion 5EC	19713-217	1B	No	3 pints/acre	24	3	14	2	6 pints	<i>Drosophila</i> included on the label. Use max rate.
Malathion 57%	67760-40-53883	1B	No	3 pints/acre	24	3	14	2	6 pints	<i>Drosophila</i> included on the label. Use max rate.
Malathion 8 Aquamul	34704-474	1B	No	1.88 pints/acre	24	3	14	2	3.76 pints	<i>Drosophila</i> included on the label. Use max rate.
Mustang Maxx	279-3426	3A	No	4.0 fl oz/acre	12	1	7	6	24 fl oz	'Vinegar flies' and SWD listed on the label.

^a If yes, a copy of the 2(ee) approval must be in possession when the material is applied.

^b Minimum number of days before reapplication of the material.