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Narrow distillation range Horticultural Mineral Oils available for use on citrus in 2014

by
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Horticultural mineral oils (HMOs) are registered in combination with several fungicides and insecticides at concentrations of 0.5% and below and play an important role in the control of citrus black spot. At higher concentrations, HMOs also provide important IPM-compatible control options for red scale and other pests that do not result in pest repercussions. All HMOs sold for use on citrus in South Africa are made from imported base oils or are imported final products, so their quality is superior to what was available 20 years ago and there is less variation between batches than in the past. When using HMOs it is important to avoid spraying trees that are under stress or during very hot and dry conditions. If this rule is observed then medium grade HMOs can be used at concentrations of 0.5% and below without any concern for detrimental effects on trees or crop. A bit more caution should be exercised when using medium-heavy oils and it is best to avoid using them on mandarins. Heavy oil should be avoided on mandarins and other soft citrus cultivars and where summers are dry and hot and winters are cold. Table 1 provides guidelines for the recommended use of high concentrations of HMOs for red scale control. Table 2 shows the specifications for HMOs that are currently available for use on citrus in South Africa.

The 50% distillation temperature appearing on most HMO labels is based on the ASTM D1160 test that is conducted at a reduced pressure of 1.333 kPa, rather than atmospheric pressure (101.325 kPa). This test was difficult to conduct, with poor repeatability and is now being replaced by a simpler gas chromatograph test called ASTM D2887 which provides approximate distillation temperatures at atmospheric pressure. In order to compare these temperatures directly with D1160 results and what is on the label they must be converted by using the following equation.

$y = 0.8x - 80°C$ where,

x is the temperature at 101.325 kPa, in degrees Celsius;
y is the temperature at 1.333 kPa, in degrees Celsius.

The results from the D2887 test usually provide a 10% distillation temperature that is lower than that found with D1160, so the 10-90% distillation range may appear broader, but the 50% distillation temperature is within the range of experimental error for the D1160 test.

Table 1. Maximum dosage ranges recommended for red scale control based on Horticultural Mineral Oils alone.

Treatment time and remarks	HMO grade and concentration (%)		
	Medium	Medium/Heavy[1]	Heavy[1,2]
Winter application: from budswell to budburst (July to August).	1.0-1.25	Do not use >0.3%	Do not use
Early summer application: 4-9 weeks after petal fall. Only if scale is moving onto the fruit.	0.5-0.8	0.5-0.7	0.3-0.6
Mid-summer application: 10-14 weeks after petal fall.	1.25-1.5	1.0-1.4	0.8-1.3
Maximum, combined amount of oil from more than one application permitted between 4 weeks after petal fall and harvest.	1.75-2.3	1.6-2.1	1.4-1.9

[1]Do not use on mandarins. [2]Do not use in the Northern, Western or Eastern Cape provinces.

Table 2. Typical specifications for the different grades of Horticultural Mineral Oils available for use on citrus in South Africa (no light HMOs are available)

Property	Medium				Medium/Heavy		Heavy
	PFP Citrimist	Orchex 796*	BP Medium	Citrole 100	Laincoil	EOS	BP Cipron
Viscosity 40°C in mm^2/s	13.2	14.8	12.4	16	14.4	12.6	19
Paraffinicity %	-	71	74	72	-	74	67
Unsulfonated residue % ASTM D483	99	95	99.8	97	>92	99.8	99
50% Dist. temp. ASTM D1160/2887	222/ -	223/ -	228/382	221/ -	232/ -	235/ -	242/399
10-90% Dist. range ASTM D1160/2887	33	26/ -	45/84	32/ -	-	21/ -	41/70
Median carbon no.	23	23	23	23	-	24	26

*No longer available but specifications provided for reference purposes

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Smalbestek-distillasie Tuinboukundige Minerale Olies beskikbaar vir gebruik op sitrus in 2014

deur
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Tuinboukundige minerale olies (TMOs) is in kombinasie met verskeie swamdoders en insekdoders teen konsentrasies van 0.5% en laer geregistreer en speel 'n belangrike rol in die beheer van sitrusswartvlek. Teen hoër konsentrasies maak TMOs ook voorsiening vir belangrike GPB-verenigbare beheeropsies teen rooidopluis en ander plae deurdat dit nie tot plaag-reperkussies aanleiding gee nie. Alle TMOs wat vir gebruik op sitrus in Suid-Afrika verkoop word is ingevoer, of word van ingevoerde basis-olies gemaak. Die kwaliteit van die produkte is dus baie beter as dit wat 20 jaar gelede beskikbaar was, en daar is ook minder variasie tussen die verskilende versendings as in die verlede. Wanneer TMOs gebruik word, is dit belangrik om nie bome wat onder stremming is, of as daar baie warm en droë toestand heer te spuit nie. As hierdie reël nagekom word, kan medium graad TMOs teen konsentrasies van 0.5% en laer gebruik word sonder enige bekommernis oor die nadelige uitwerkings op die bome of oes. Groter mate van omversigtigheid moet uitgeoefen word as medium-swaar olies gebruik word en dit is beter om nie hierdie tipe olies op mandaryne te gebruik nie. Die gebruik van swaar olies op mandaryne en ander sagtesitrus kultivars moet vermy word, en waar die somers droog en warm, en die winters koud is. Tabel 1 verskaf riglyne vir die aanbevole gebruik van hoë konsentrasies van TMOs vir die beheer van rooidopluis. Tabel 2 toon die spesifikasies vir TMOs wat tans vir die gebruik op sitrus in Suid-Afrika beskikbaar is.

Die 50% distillasie temperatuur wat op die meeste TMO etikette verskyn, is op die ASTM D1160 toets gebaseer wat teen 'n verminderde lugdruk van 1.333 kPa gedoen word, eerder as atmosferiese druk (101.325 kPa). Hierdie toets was moeilik om uit te voer, met swak herhaalbaarheid, en word nou deur 'n soortgelyke eenvoudiger gaschromotograaf-toets naamlik die ASTM D2887, vervang. Hierdie toets maak voorsiening vir geskatte distillasie-temperature by atmosferiese druk. Ten einde hierdie temperature direk met D1160 resultate en dit wat op die etikette is te vergelyk, moet hul omgeskakel word deur die volgende formule te gebruik.

$y = 0.8x - 80°C$ waar,

x die temperatuur by 101.325 kPa is, in grade Celsius;
y die temperatuur by 1.333 kPa is, in grade Celsius.

Die resultate van die D2887 toets verskaf gewoonlik 'n 10%-distillasie temperatuur wat laer is as wat met die D1160 gevind word, so die 10-90% distillasie bestek mag wyer lyk, maar die 50% distillasie temperatuur is binne die omvang van die eksperimentele fout vir die D1160 toets.

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Tabel 1. Maksimum dosis-reeks wat aanbeveel word vir die beheer van rooidopluis, gebaseer op Tuinboukundige Minerale Olies alleenlik.

Behandelingstyd en opmerkings	TMO graad en konsentrasie (%)		
	Medium	Medium/Swaar[1]	Swaar[1,2]
Winter toediening: vanaf knopswel tot bot (Julie tot Augustus).	1.0-1.25	Moenie gebruik nie >0.3%	Moenie gebruik nie
Vroeë-somer toediening: 4-9 weke na blomblaarval. Slegs wanneer dopluise op vrugte verskyn.	0.5-0.8	0.5-0.7	0.3-0.6
Mid-somer toediening: 10-14 weke na blomblaarval.	1.25-1.5	1.0-1.4	0.8-1.3
Maksimum, gekombineerde hoeveelheid van olie van meer as een toediening toegelaat tussen 4 weke na blomblaarval en oes.	1.75-2.3	1.6-2.1	1.4-1.9

[1]Moenie op mandaryne gebruik nie. [2]Moenie in die Noord-, Wes-, of Oos-Kaap provinsies gebruik nie.

Tabel 2. Tipiese spesifikasies vir die verskillende grade van Tuinboukundige Minerale Olies beskikbaar vir die gebruik op sitrus in Suid-Afrika (geen ligte TMOs is beskikbaar).

Eienskap	Medium				Medium/Swaar		Swaar
	PFP Citrimist	Orchex 796*	BP Medium	Citrole 100	Laincoil	EOS	BP Cipron
Viskositeit 40°C in mm^2/s	13.2	14.8	12.4	16	14.4	12.6	19
Paraffinicity %	-	71	74	72	-	74	67
Ongesulfoneerde residu % ASTM D483	99	95	99.8	97	>92	99.8	99
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10-90% Dist. bestek ASTM D1160/2887	33	26/ -	45/84	32/ -	-	21/ -	41/70
Mediane koolstof no.	23	23	23	23	-	24	26

*Nie langer beskikbaar nie, maar spesifikasies word vir verwysingsdoeleindes verskaf