

Treevix for postemergence weed control in Florida citrus

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Treevix (saflufenacil), a herbicide developed by BASF Corp., is registered for use in perennial crops such as citrus, nut and pome trees. The Environmental Protection Agency approved its registration in 2009 for use in citrus. Treevix is recommended for postemergence control of broadleaf weeds such as beggar's-ticks, cutleaf evening primrose, pigweed, night shade and morning glory.

Treevix is a uracil herbicide that inhibits an enzyme important for the production of chlorophyll in plants. Rapid death of susceptible plants results from loss of membrane integrity. Upon application on actively growing weeds, susceptible plants usually develop chlorotic and necrotic injury symptoms within hours after application. Death of susceptible plants becomes evident as early as three days after treatment (DAT). Treevix is primarily a contact herbicide, but is also rapidly absorbed by roots and foliage.

The recommended label rate for Treevix in citrus is 1 oz./ac. in a single application with a maximum annual rate of 3 oz./ac. It can be applied as a single application or sequentially up to three times per year, with each application separated by at least 21

days. Addition of methylated seed oil and ammonium sulfate are required to maximize the efficacy of Treevix on broadleaf weeds.

Treevix has excellent crop safety. It can be tank-mixed with either a grass herbicide or with another postemergence herbicide that has activity on grass weeds to broaden the spectrum of control.

TRIAL RESULTS

Several field trials were conducted in 2009 and 2011 within the state to evaluate the efficacy of Treevix on weeds commonly found in citrus groves. In 2009, a trial was conducted on 3-year-old grapefruit at Frostproof involving Treevix applied alone at 1 to 3 oz./ac. or tank-mixed with either Roundup Original at 64 fl. oz./ac. or Prowl H₂O at 112 fl. oz./ac. or both. The major broadleaf weeds at the grove site were Florida/Brazil pusley, cutleaf evening primrose and Spanish needles while the predominant grass species was Texas panicum. Results of the trial indicated that all herbicide treatments were effective in controlling these weeds compared with the untreated control.

Treevix applied alone at 1 to 3

oz./ac. resulted in 78 percent to 84 percent, 88 percent to 95 percent and 81 percent to 87 percent control of Florida/Brazil pusley, Spanish needles and cutleaf evening primrose, respectively, at 15 DAT. Control was better than or comparable with Roundup Original applied at 64 fl. oz./ac. which provided 75 percent, 89 percent and 79 percent control of Florida/Brazil pusley, Spanish needles and cutleaf evening primrose, respectively.

Weed control with Treevix applied alone at all rates started to decline at 30 DAT and by 90 DAT. Control of Florida/Brazil pusley, Spanish needles and cutleaf evening primrose was minimal at 45 percent to 55 percent, 30 percent to 43 percent and 62 percent to 77 percent, respectively.

Since Treevix is a contact herbicide, plant parts that do not get sprayed have the potential to regrow, resulting in a loss in control. Tank-mixing Treevix with Roundup Original or Roundup Original and Prowl H₂O greatly improved control of broadleaf weeds. For example, control of Spanish needles and cutleaf evening primrose with Treevix tank-mixed with Roundup and Prowl H₂O at 15 DAT and 30 DAT was significantly better than Treevix applied alone. Furthermore, tank-mixing Treevix with Roundup and Prowl H₂O provided a longer residual control of these broadleaf weeds. Control of Florida/Brazil pusley and cutleaf evening primrose at 90 DAT was >70 percent and >80 percent, respectively.

Field trials conducted in 2011 near Lake Alfred and Winter Garden evaluated Poast Plus as a tank-mix partner with Treevix in addition to Roundup Weathermax and Prowl H₂O. Results of these trials were very promising as these tank-mix partners significantly improved control of both broadleaf and grass weeds. The Lake Alfred trial in 2011 showed that initial control at 15 DAT of broadleaf weeds such as Brazil pusley, puncture vine and eclipta with Treevix at 1.0 oz./ac. was 82 percent, 89 percent and 87 percent respectively and was comparable with Treevix tank mixed with Poast Plus, Poast Plus + Prowl H₂O and Roundup + Prowl H₂O (Table 1, page 26). The highest initial control of these broadleaf weeds was with a tank mix of Treevix, Poast Plus and Roundup Weathermax. At 45 DAT control of Brazil pusley, puncture vine and eclipta with Treevix at 1.0 oz./ac. declined to 58 percent, 60 percent and 58 percent, respectively (Table 1).



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Citrus and Peach Production

Table 1. Weed control at 15 and 45 days after treatment (DAT) with Treevix applied alone or in combination with other herbicides near Lake Alfred, FL in 2011

Herbicide ^a	15 DAT						45 DAT ^a					
	Brazil pusley	puncture vine	eclipta	Bermuda grass	guinea grass	southern sandbur	Brazil pusley	puncture vine	eclipta	Bermuda grass	guinea grass	southern sandbur
	-% control -						-% control -					
Nontreated Control	0	0	0	0	0	0	0	0	0	0	0	0
Treevix 0.75 oz/ac	64	70	70	1	4	1	49	52	50	0	0	0
Treevix 1.0 oz/ac	82	89	87	3	3	6	58	60	58	0	0	0
Poast Plus 1.75 pt/ac	0	0	1	66	74	1	0	0	0	49	52	50
Poast Plus 2.25 pt/ac	1	3	0	88	89	87	0	0	0	58	60	59
Treevix 0.75 oz/ac + Poast Plus 1.75 pt/ac	73	70	70	68	66	67	50	52	50	49	52	50
Treevix 1.0 oz + Poast Plus 1.0 pt/ac	88	89	88	82	78	75	59	60	60	58	60	59
Treevix 0.75 oz/ac + Poast Plus 1.75 pt/ac + Prowl H ₂ O 4 pt/ac	88	86	77	79	79	82	72	68	70	73	72	73
Treevix 1.0 oz/ac + Poast Plus 2.25 pt/ac + Prowl H ₂ O 5 pt/ac	88	86	88	88	86	82	71	67	70	73	73	73
Treevix 1.0 oz/ac + Poast Plus 2.25 pt/ac + Prowl H ₂ O 6 pt/ac	86	83	86	86	79	79	70	67	70	73	74	73
Treevix 1.0 oz/ac + Poast Plus 2.25 pt/ac + Roundup Weathermax 4.5 pt/ac	96	92	98	92	98	91	79	79	79	80	79	79
Treevix 1.0 oz/ac + Roundup Weathermax 4.5 pt/ac + Prowl H ₂ O 6 pt/ac	88	89	90	89	89	87	79	79	78	79	79	79
Roundup Weathermax 5 pt/ac	72	73	71	74	71	70	71	71	72	72	71	70

^aAll herbicide treatments included ammonium sulfate at 17 lb./100 gal. solution and methylated seed oil applied at 1% v/v (volume per volume)

Tank-mixing Treevix with other herbicides provided significantly higher control of these broadleaf weeds. Among the tank mixes, Treevix + Poast Plus + Roundup and Treevix + Roundup + Prowl H₂O provided highest control of Brazil pusley, puncture vine and eclipta. Similarly, density and biomass of these broadleaf weeds at 60 DAT were significantly lower in plots receiving the tank-mix treatments than those treated with Treevix alone.

Using the same treatments, field trials near Winter Garden in 2011 showed a similar level of control with

Treevix applied alone and in various tank-mix combinations (Table 2, page 28). In addition to Brazil pusley, dayflower and evening primrose were excellently controlled with Treevix applied alone and in various combinations with Poast Plus, Prowl H₂O and Roundup Weathermax at 15 DAT. Although control with all herbicide treatments declined by 45 DAT, tank-mix treatments provided better control compared with Treevix applied alone. Weed densities were reduced with all Treevix tank mixes compared with Treevix alone and the untreated plots.

Treevix tank-mixed with Poast Plus + Roundup Weathermax or with Roundup Weathermax + Prowl H₂O greatly reduced broadleaf weed biomass compared with the untreated control at 60 DAT.

Treevix does not control grass weeds. Results of the field trial conducted near Frostproof in 2009 indicated that there was poor season-long control of Texas panicum with Treevix even at 3 oz./ac. compared with Roundup original. Tank-mixing Treevix with Roundup Original and Prowl H₂O greatly improved Texas panicum control such that at 90 DAT control was >80 percent. In both 2011 trials near Lake Alfred and Winter Garden, grass weeds such as Bermuda grass, guinea grass, southern sandbur, barnyardgrass, goosegrass and Johnson grass were not controlled with Treevix applications (Tables 1 and 2). Tank mixing Treevix with Poast Plus, however, significantly improved grass control. Furthermore, adding Prowl H₂O to the tank mix of Treevix and Poast Plus further enhanced grass control such that at 45 DAT control of Bermuda grass, guinea grass and southern sandbur at the Lake Alfred site was >70 percent while control

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Table 2. Weed control at 15 and 45 days after treatment (DAT) with Treevix applied alone or in combination with other herbicides at Winter Garden, FL in 2011

Herbicide ^a	15 DAT						45 DAT					
	Brazil pusley	day flower	evening primrose	barnyard grass	goose grass	Johnson grass	Brazil pusley	day flower	evening primrose	barnyard grass	goose grass	Johnson grass
	-% control -						-% control -					
Nontreated Control	0	0	0	0	0	0	0	0	0	0	0	0
Treevix 0.75 oz/ac	63	70	67	6	3	3	44	46	49	0	0	0
Treevix 1.0 oz/ac	75	79	79	9	3	3	56	58	57	0	0	0
Poast Plus 1.75 pt/ac	8	7	6	64	66	71	0	0	0	55	52	54
Poast Plus 2.25 pt/ac	12	17	21	75	77	79	0	0	0	61	62	65
Treevix 0.75 oz/ac + Poast Plus 1.75 pt/ac	74	73	75	73	75	72	53	56	51	53	50	53
Treevix 1.0 oz + Poast Plus 1.0 pt/ac	82	86	79	83	82	83	59	59	62	58	57	63
Treevix 0.75 oz/ac + Poast Plus 1.75 pt/ac + Prowl H ₂ O 4 pt/ac	83	84	82	83	80	78	62	64	63	59	61	60
Treevix 1.0 oz/ac + Poast Plus 2.25 pt/ac + Prowl H ₂ O 5 pt/ac	85	83	84	84	80	80	64	63	63	63	62	64
Treevix 1.0 oz/ac + Poast Plus 2.25 pt/ac + Prowl H ₂ O 6 pt/ac	85	83	83	83	85	83	67	69	68	64	66	68
Treevix 1.0 oz/ac + Poast Plus 2.25 pt/ac + Roundup Weathermax 4.5 pt/ac	98	96	95	92	92	92	76	73	80	80	80	82
Treevix 1.0 oz/ac + Roundup Weathermax 4.5 pt/ac + Prowl H ₂ O 6 pt/ac	91	91	89	77	78	79	73	71	71	73	70	71
Roundup Weathermax 5 pt/ac	79	76	78	78	79	80	65	64	65	62	64	63

^aAll treatments containing Treevix included ammonium sulfate at gal solution and methylated seed oil applied at 1% v/v (volume per volume)

of barnyardgrass, goosegrass and Johnson grass was >60 percent at the Winter Garden site. Among the tank-mix combinations, addition of Roundup Weathermax was the best treatment for control of grass weeds at both sites as it provided the highest control at 45 DAT and significantly reduced grass weed density and biomass at 60 DAT (Tables 1 and 2).

Results of these trials suggest that Treevix can effectively control broadleaf weeds, but not grass weeds. Addition of a tank-mix partner that has activity on grass weeds such as

Poast Plus, Prowl H₂O and glyphosate (in various formulations) not only improved broadleaf weed control, but also widened the spectrum of control. Treevix can be an additional option in managing difficult-to-control as well as herbicide-resistant weeds. Treevix — with its unique chemistry, great burndown capability and crop safety — is an excellent addition to the available herbicide options in managing broadleaf weeds in citrus.

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WHAT'S SHAKIN'

Mireia Bordas, agronomic engineer with Agromillora Research, SL in Barcelona, Spain, reported on high-density citrus planting in Spain during the April 2012 International Symposium on Mechanical Harvesting and Handling Systems of Fruits and Nuts. Several Spanish citrus growers are exploring the economic feasibility of high-density planting as a strategy to enhance their market competitiveness.

Since 2008, Agromillora has been working collaboratively with IFAPA-Centro 'Las Torres' and with IVIA-Research Center to develop dwarfing rootstocks, new canopy shaping techniques and crop management practices. Over-the-row harvesting equipment is being tested. A video clip showed a New Holland grape harvester being used to harvest Agromillora's field trials.

Bordas's presentation can be found at <http://citrusmh.ifas.ufl.edu>

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