



## AIRWAYS

A look at using aerial applications of herbicides to control melaleuca  
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An effective melaleuca management program is difficult, and a major reason for this is the lack of cost-effective control methods. A successful management program will combine the use of herbicides with biological, mechanical and physical control methods. All of these methods are currently being used or studied (Laroche, 1994). Individual tree treatments are the most cost-effective and environmentally sound for small scale management and containment of melaleuca, but these methods are too expensive and time consuming for large scale control operations. Research and development of herbicides and application rates that allow for cost-effective melaleuca management are essential.

Selection of appropriate herbicides for aerial control of melaleuca is difficult because the trees are often in aquatic habitats, on saturated soil, or in sensitive natural areas where damage to non-target vegetation is of concern. One of the major drawbacks to successful large-scale melaleuca management is the lack of selective, foliar-active herbicides that provide consistent results. Foliar-active herbicides are generally more selective and have shorter soil residence times than soil-active herbicides. The Game and Freshwater Fish Commission and the United States Army Corps of Engineers conducted early investigations into the herbicidal control of melaleuca (Stocker and Sanders, 1981). Application rates and methods of many non-crop and forestry herbicides were tested. These tests showed that melaleuca was going to be very difficult to control with available herbicides and conventional application techniques. Only the application of VELPAR L (hexazinone) at a rate of 4 lbs/acre and SPIKE 40P (tebuthiuron) at a rate of 10 lbs/acre produced greater than 80% control.

The South Florida Water Management District, in cooperation with various other agencies, has been investigating the effectiveness of aerial application on melaleuca and its effects on non-target vegetation with both foliar-active and soil-active herbicides. Laroche et al, (1992) evaluated several herbicides for aerial application: VELPAR L, SPIKE 40P, ARSENAL (imazapyr), GARLON (triclopyr) and RODEO (glyphosate). These studies indicated that both VELPAR and SPIKE were effective at controlling melaleuca while ARSENAL, RODEO, and GARLON yielded inconsistent results. Subsequent trials were established with VELPAR and SPIKE at the Strazzulla tract (near the Loxahatchee National Wildlife Refuge) and WCA-2B. These trials indicated that VELPAR, at a rate of 4 lbs/acre was less damaging to certain

native species such as pine, cypress, and sawgrass than SPIKE (Hoyer and Fox, 1992). Based on this information, the District started to operationally spray melaleuca using aerial applications on Lake Okeechobee in May of 1994. Approximately 1300 acres of melaleuca were treated with VELPAR west of the Moore Haven canal. This treatment was very successful, over 90% of the trees were killed and re-growth of seedlings was minimal. However, the herbicide manufacturer did not renew the Special Local Need Label that allowed for the application of VELPAR to wetland areas during the dry season. VELPAR has been unavailable for melaleuca control in wetlands since January 1, 1995.

Other studies conducted at the Big Cypress National Preserve (BCNP) in June, 1993 indicated that a combination of ARSENAL at 3 qts/acre and RODEO at 2 qts/acre applied with a methylated seed-oil surfactant provided 95% control of melaleuca. Additional treatment conducted in Lake Okeechobee and Everglades National Park in June, 1994 with the same rates of these two herbicides did not prove as effective. After much discussion, it was decided to incorporate the following recommendations for future aerial application trials on melaleuca:

Use maximum label rates of both ARSENAL (3 qts/acre) and RODEO (3.75 qts/acre) with a methylated seed-oil or an organo-silicon/methylated seed-oil surfactant in a total volume of 15-20 gallons/acre. Previous treatments were applied with 5-10 gallons total volume/acre.

Use a microfoil boom with small nozzles (0.020) and apply the herbicides at half rate while overlapping each swath by 50% to deliver the full dose. These two modifications, along with increased total volume, would greatly improve efficacy. It was determined that the use of smaller nozzles (0.020) at Big Cypress may have provided better coverage that resulted in increased efficacy. The treatments in Lake Okeechobee and ENP were applied with larger nozzles (0.045).

Time of year might be an important factor influencing herbicide efficacy. All previous aerial treatments were applied in late spring or early summer. Melaleuca exhibits a flush of new growth during January and February, which suggests an active growing period. Therefore, a herbicide application during this time may be more effective. Three treatment windows, June-July, September-October, and January-February, were proposed to determine if efficacy would vary with time of application. American Cyanamid received

an Experimental Use Permit in June 1995, for the application of ARSENAL over non-flowing water for a total area of 900 acres in Florida. Consequently, the District began applying the combination of ARSENAL and RODEO at 3 qts/acre each over large areas in the Water Conservation Areas and Lake Okeechobee. The objectives of these new treatments were to determine the feasibility of large-scale aerial application for melaleuca, and to test four different surfactants, at two quarts per acre each. All treatments were applied with a TVB (Waldrum Specialties) boom, with 0.030 nozzles, in a total volume of 10 gal/acre. The helicopter overlapped 50% of each swath to provide a total volume of 20 gal/acre. Each plot was approximately 50 acres in size. Half of each of the plots were retreated one year later with the same rate of ARSENAL and RODEO and 4 quarts of SUN-WET per acre.



**Dead Head? Treated melaleuca head in Lake Okeechobee's marsh.**

The application method and equipment remained the same. The list of treatments, and percent defoliation for the single and double application, are listed in Table 1. The repeated application resulted in over 85% control of melaleuca in all of the plots at both locations.

Additional aerial treatments were conducted in November of 1996 and February 1997 to determine if herbicide efficacy would vary with time of year. Results of these treatments are not yet available. However, preliminary observations indicate better efficacy with the February treatment.

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TREATMENT	WATER CONSERVATION AREAS		LAKE OKEECHOBEE	
	ONCE	TWICE	ONCE	TWICE
SUN-IT	54%	90%	43%	83%
SUN-WET	65%	93%	58%	97%
DYNE-AMIC	66%	96%	52%	87%
RIVET	61%	81%	44%	89%

Percent defoliation of melaleuca treated with a combination of ARSENAL and RODEO at three quarts per acre each once (in 1995), and twice (in 1995 and 1996).

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