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A method to control vines (Araceae) growing on oil palm stems

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Introduction

Several species of vines grow on oil palm stems and their presence makes it difficult to judge bunch ripeness during regular harvesting cycles. Many of these plants belong to the Araceae family (*Philodendron* sp., *Syngonium podophyllum*), which are able to climb the stem from the weeded circle around the palm when weed control is inefficient.
Normally, these vines are removed manually, but during the operation, many fragments drop to the ground and will root if not removed, making costs even higher. Some systemic herbicides offer a good alternative for handling this problem, but special precautions must be taken to avoid drift and worker contact with the chemicals.
During a preliminary trial, two mixtures showed promise: (1) one part water, one part WK® (adherent), and one part glyphosate; and (2) one part water, one part WK, and a combination of three parts glyphosate to one part triclopyr. When triclorpyr was used in a higher proportion, it caused rapid defoliation, but the stems of the weed remained alive and hanging around the palm stem. This paper details the results of a trial that had as its main objective the optimization of glyphosate and triclopyr mixture, and the application method, in order to obtain the best control of *Philodendron* sp. growing on oil palm stems.

Materials and methods

The experimental units were oil palm stems with at least 60% coverage of *Philodendron* sp. (Fig. 1). Treatments are described in Table 1. Herbicide blends were applied with a paint roller, equipped with a brush meant to be used on a regular smooth wall (Fig. 1). This equipment avoids drift and also eliminates drips that could affect the workers. Each palm stem got approximately 100 ml of the mixture. During the application period, mean temperature and relative humidity were 32ºC and 82%.

The effectiveness of the commercial coadjuvant WK® was compared with a product derived from palm oil (Agrofilm®). The degree of control was determined at 22, 45 and 65 days after treatments were applied. Statistical analysis was done using ANAWIN 2005, using a completely randomized design, with 10 treatments and five replications. Means were compared using a MSD test (p = 0.05). Treatment effectiveness was checked 10 and 20 days later, using the scale in Table 2.

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Fig. 1. Oil palm stem covered by vines (Araceae) and application of herbicide with a paint roller

Table 1. Herbicide mixtures used in a trial to control the vine *Philodendrom* sp. growing on oil palm stems

Treatment	Proportions		Herbicide	
	Water	WK®	Glyphosate	Triclopir
1			0.75	0
2	1.25	1	0.375	0.375
3			0	0.75
4			0.50	0
5	1.50	1	0.25	0.25
6			0	0.5
7			1	0
8	1	1	0.75	0.25
9			1	0
10			0.75	0.25

7 and 8: controls based on previous trials.

** Treatments with WK® were substituted by a surfactant derived from palm oil (Agrofilm)®*

WK = adherent-surfactant

Amonium sulphate (20 g/l) used in all treatment to improve herbicide effect.

Table 2. Scale for evaluating the degree of control obtained with several herbicide mixtures applied to *Phylodendron* sp. creeping on oil palm stems		
% control	Degree of control	Symptoms on plant
<10	Poor	No apparent effect
11-20	Light	Atrophy and/or light chlorosis
21-30	Moderate	Light atrophy, light chlorosis and light necrosis
31-40		Medium atrophy, severe chlorosis, and light necrosis
41-50		Medium atrophy, severe chlorosis, light necrosis and some plants dead
51-60	Good	Severe atrophy and/or increase in the number of dead plants
61-70		Between 61 and 70% of plants dead
71-80		Between 71 and 80% of plants dead
81-90		Between 81 and 90% of plants dead
>91	Excellent	Between 91 and 100% of plants dead

The trial was conducted during the months of March and May, 2005 (523.3 mm rainfall), in a commercial oil palm plantation located on the central Pacific coast of Costa Rica (9° 23,442´ N; 84° 03,631´ W).

Results and discussion

An oil palm stem, with a mean coverage of 60% of *Philodendron* sp. can be treated with herbicide in less than four minutes (average 3.36 min), which compares very favorably with the time needed to do this job manually (approximately 25 minutes), which does not consider the extra time needed to collect the plant fragments that drop to the ground or onto leaf axils. The chemical treatment results in a time economy of 87% in labor, and highly reduces the risk that any plant fragment will sprout again (Figs. 2, 3). All treatments gave an adequate level of control during the first 65 days according to scale in Table 2.

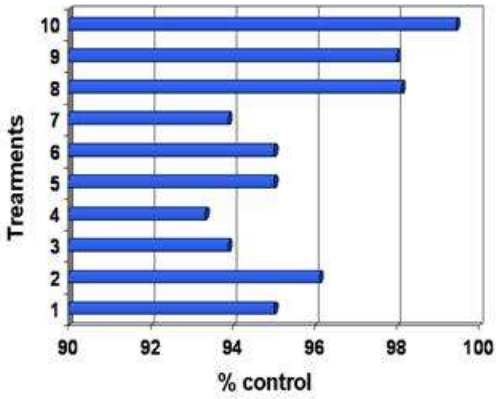

Fig. 2. Chemical control of *Philodendron* sp. established as a vine on oil palm stems. Control measured during the first 65 days after treatment. Quepos. Costa Rica.

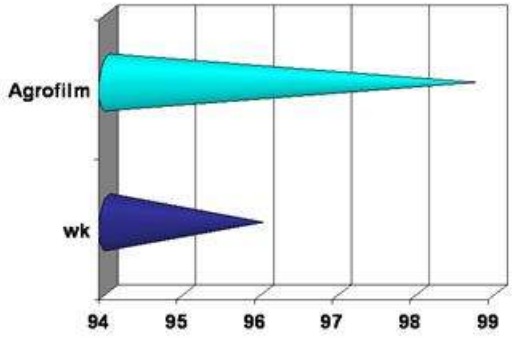

Fig. 3. Effect of the adjuvant on the degree of control of *Philodendrun* sp. Quepos, Costa Rica. Control (%) according to table 2.

The coadjuvant Agrofilm, which is obtained from palm oil, was superior to WK and was less expensive (61%). In general, the chemical treatment was less expensive than the manual one (36% less costly per palm). The best treatment was the mixture of one part water, one part Agrofilm and one part glyphosate, which cost 64% less than manual vine removal (Figs 4, 5).

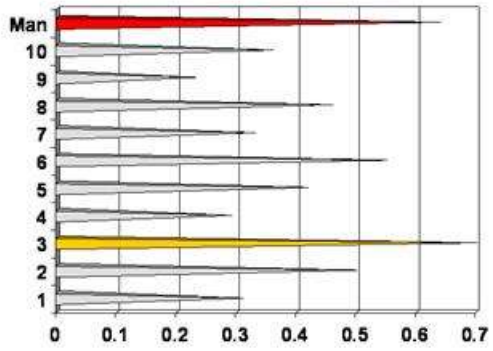

Fig. 4. Cost of the treatment with herbicide to eliminate *Philodendron* sp. creeping on oil palm stems. Quepos, Costa Rica

Fig. 5. Excellent vine control on oil palm stem

Conclusions

It is possible to have efficient and economic control of creeping plants of the Araceae family growing on oil palm stems. When these vines grow vigorously on the palm stem, they negatively affect harvesting, because they interfere with the workers' ability to correctly judge bunch

ripeness. *Philodendron* sp. can be readily controlled using glyphosate applied with a paint roller, which eliminates drift and avoids chemical contact with workers.

The use of other herbicides mixed with glyphosate did not improve its performance, but a coadjuvant obtained from palm oil (Agrofilm), greatly improved control and was not as expensive as other commercially available products. Agrofilm can be substituted with refined oil palm olein plus 1.5% v/v of an emulsifier.

It is possible to use a knapsack sprayer to apply the herbicide and increase efficiency. However, special care must be taken to avoid drift, and not to apply the product on inflorescences and bunches.