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Fungicide Treatment Affects Seed Germination of Pygmy Date Palm

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Palm seeds are sometimes stored for varying periods of time in polyetheylene bags after the pericarps are cleaned from the seed. Dusting with fungicide is usually recommended before they are placed in the bags. Full-strength, wettable powder formulations of captan (N-trichloromethyl-thio-3a,4,7,7a-tetrahydrophthalimide) or thiram (tetramethylthiuram disulfide) are the most common seed protectants used for this purpose. Seeds of exotic species received from overseas frequently arrive with a substantial coating of fungicide, usually captan (pers. obs.). The purpose of this experiment was to observe any such affects on the germination of pygmy date palm (*Phoenix roebelenii* O'Brien) seeds.

On 10 Oct 1992, 150 freshly cleaned, ripe seed of pygmy date palm were treated with captan 50% wettable powder (WP), thiram 75% WP or no fungicide. One hundred grams of each fungicide was placed in a plastic bag with the seeds and shaken until the seeds were uniformly coated with the material. Each treatment consisted of 10 replications of fifteen seeds. The seeds were sown in small flats of 1:1 (v:v) sphagnum peat moss and perlite and placed on a greenhouse mist bench (10 sec at 15 min interval) in a randomized complete block design. Beginning 26 Nov 1992 and again on 10 and 24 Dec and 7 Jan 1993, the number of germinated seed in each replication was counted. Emergence of the cotyledonary petiole more than 0.5 cm from the testa was the minimum criterion for a seed to be considered germinated. The experiment was terminated on 7 Jan 1993, and percent total germination was determined for each sampling date. Arcsine transformed percentage data and their means were analyzed for significance with ANOVA and Waller-Duncan

mean separation tests (SAS Institute, Cary, NC).

Coating pygmy date palm seed with either captan or thiram had the most significant effects during the first weeks of germination (Table 1). Controls had much higher germination percentages that either captan- or thiram-treated seeds on 26 Nov ($p = 0.0001$), with captan treatment showing the greatest inhibitory effects. Two weeks later, inhibitory effects of both fungicides were not significantly different from each other, but controls were still germinating better than either treatment ($p = 0.0001$). By 24 Dec, the inhibitory effects of the fungicide treatments began to level off ($p = 0.0458$), although captan-treated seeds were still germinating more poorly than controls. At termination, there was no significant difference between controls and thiram-treated seeds, but mean final germination percentage for the captan treatment was significantly lower ($p = 0.0249$) than either controls or thiram-treated seeds. No significant block effects were observed at any of the sampling times ($p > 0.63$). Necrosis of the cotyledonary petiole subsequent to germination was also observed among the captan-treated seeds.

In conclusion, results with pygmy date palm seed indicate that direct contact of palm seed with full-strength seed protectant fungicides may inhibit germination. While both thiram and captan reduced the initial rate of germination, only captan significantly reduced total germination percentage.

Table 1. Effects of captan and thiram treatment on germination of pygmy date palm seed.

		% Germination		
Treatment	Nov 26	Dec 10	Dec 24	Jan 7
Control	34.0[az]	67.3[a]	77.3[a]	79.3[a]
Captan	2.0[c]	24.0[b]	54.0[b]	58.7[b]
Thiram	12.0[b]	38.7[b]	66.7[ab]	76.0[a]

[z]Mean separations within columns by the Waller-Duncan k-ratio method (k=100) on arcsine transformed percentage data. Means followed by the same letter are not significantly different.

Catclaw Mimosa in Florida

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Catclaw mimosa (*Mimosa pigra* L.), a native of Central America, was introduced in Florida probably through the ornamental plant nursery industry in the early 1950's. Catclaw mimosa, or giant sensitive plant as it is also sometimes called, is unique in that its leaves close (fold together) rather quickly when touched, exhibiting an animal-like response that is a novelty among plants. For this reason, catclaw mimosa has been introduced in many countries as a botanical curiosity.

Catclaw seeds are covered with hooked hairs which allows seeds to attach to moving objects. No direct evidence is available to suggest the manner in which catclaw mimosa was introduced in Florida. However, its presence near old ornamental plant nurseries in the Jupiter and Avon Park areas suggest catclaw mimosa was introduced as a novelty plant.

Distinguishing Field Characteristics

Distinctive field characteristics of catclaw mimosa include: sensitive, evenly bipinnately compound leaves, recurved thorns on the stem, petiole, and leaf rachis; straight spines at the junction of leaflets, pink flowers arranged in a head and extended on a stalk from the stem, clusters (hands) of flat brown pods (fingers) each with transverse sections held by sutures, and single seeded sections of the pod with golden hairs scattered on the surface which break from the fingers, leaving an empty frame.

Seed Germination and Growth

Mature catclaw mimosa seeds which drop from the fingers can float for a period of time. While seeds may travel with water currents, infestations in Florida are more likely to experience inundation rather than actual flowing water. This lack of contact with flowing water probably has reduced wide

spread dispersal of catclaw mimosa as compared to other countries. In Florida, seedlings most often occur directly under the parent plant.

Although we have found that catclaw mimosa seeds will germinate underwater and produce one set of true leaves, they will not continue growth unless emersed. In Australia, seeds have been found to float for a month, but in our studies, we have found that seeds will sink within 10 days of being placed on the surface of water. If catclaw mimosa plants were to gain access to the Everglades, then water in this wetland system would provide a major opportunity for dispersal of seeds. The wet and dry hydrologic cycle in south Florida may provide ideal conditions for germination of catclaw mimosa seeds and subsequent growth.

Catclaw mimosa produces seeds year round in the tropics and in Florida. A mature plant may produce 42,000 or more seeds a year, although in Florida, annual seed production per plant is probably much less due to poor soil fertility and heavy plant competition. Also, it appears that flowering and seed set are inhibited by shading.

Catclaw mimosa plants in Florida contain on average 4.5 fingers per inflorescence and 19.1 seeds per finger. A well fertilized plant in a Broward County golf course site had one hand with a cluster of 34 fingers. Ripe seeds develop within about 5 weeks of flowering. Seeds remain viable for many years, but young seeds have a higher germination rate than older seeds.

Once established, catclaw mimosa can withstand almost total submergence by readily forming adventitious roots and corky tissue along its stems. Plants grow best on well fertilized, disturbed sites in full sun. In infested areas, catclaw mimosa are causing problems by growing mixed with crop plants.

Known Locations of Catclaw Mimosa in Florida

As of 1993, catclaw mimosa plants have been identified growing in Broward, Palm Beach, Martin, St. Lucie, and Highlands Counties in Florida. All the plants on the St. Lucie River and a Broward County golf course are under control. Catclaw mimosa plants growing in Palm Beach, Martin, and Highlands County are the most persistent and

entrenched.

Although large populations of catclaw mimosa are not present in Florida, the plant poses a serious threat to the Everglades wetland ecosystem. The formation of adventitious roots and corky tissue along stems of flooded plants may allow catclaw mimosa to colonize wetland areas in south Florida at the expense of native aquatic plants as experienced in other countries.

Control of Catclaw Mimosa with Herbicides

Foliar applications of herbicides are generally the most effective method for controlling catclaw mimosa. Repeat treatments are usually necessary because of the sprawling growth habit of these plants which makes it difficult to obtain complete coverage of the herbicide.

Catclaw mimosa usually starts growth in the under story of a plant thicket, then grows to the top and spreads out in the sunlight. This competing vegetation interferes with survey and herbicide application efforts.

Studies with herbicides at label rates in south Florida have shown that soil applications of Spike 40P (tebuthiuron), and foliar applications of Transline (clopyralid), a broadleaf specific herbicide, will provide excellent control of catclaw mimosa. One advantage of using Transline is that it kills only catclaw mimosa and does not affect most surrounding plants. In many situations catclaw mimosa grows entwined with other plants making it difficult to spray the catclaw mimosa without getting herbicide on non-target plants. Transline is not currently registered in Florida but we are in the process of applying for a Special Local Need Registration (24C) permit.

Since most seedlings have been found to germinate under the parent plant, soil treatments with Spike in the seed fall area will probably affect most of the dropped seeds. Land use in most infested locations, however, prevents use of Spike because this herbicide is soil active and kills a broad spectrum of plants.

Foliar applications at label rates for Rodeo (glyphosate), Garlon 3A (triclopyr), and Banval 720 (dicamba) generally require repeat applications to ensure complete kill of

catclaw mimosa plants. Small plants are more easily killed than large plants.

Control of Catclaw Mimosa with Other Methods

Manual cutting or burning, or a combination of these methods, will temporarily control the spread of catclaw mimosa but rapid regrowth reduces the effectiveness of these methods. Furthermore, incomplete burning tends to stimulate seed germination and new plants will readily sprout from cut stumps. Young seedlings may be removed by pulling.

Biological controls with plant pathogens and insects are being researched in other countries, but are not presently available for use in Florida.

Several legume feeding insects have been found on catclaw mimosa in Florida. The extent to which these insects affect growth of the plants is unknown. However, we have noticed feeding activity by several insects on seeds which may reduce the seeds' viability and number available to germinate.

Eradication of Catclaw Mimosa

Eradication of catclaw mimosa in Florida appears to be an attainable goal. Since known populations in Florida are low in number of plants, an eradication program consisting of (1) surveying for new plants, (2) removal of flowers and seeds from mature plants, (3) application of herbicides to all existing plants, and where applicable, hand pulling to remove seedlings and young plants, and (4) monthly surveys to ensure no growth of seedlings is one approach to ensure no new catclaw plants will survive.

An important part of the eradication program is to inform the public of the dangers of catclaw mimosa to help find isolated plants that may have been planted for their botanical curiosity.

Herbicides are the most practical method to eradicate catclaw mimosa plants in Florida. Based on ecological studies and herbicide trials, and the number of known infestations, a two-person team working full time surveying and spraying every site once a month should be adequate to eradicate this plant in Florida. A year-round once-a-month

schedule is required because catclaw mimosa plants have been found to flower all year, and only about 5 weeks are required from flowering to seed set. Surveying and spraying will need to continue until the seed bank is depleted, approximately 10 years. Successful completion of this eradication program will eliminate the threat of catclaw mimosa becoming a major weed problem in Florida.

Reporting Catclaw Mimosa Plants

Any person who suspects catclaw mimosa may be growing in Florida needs to contact: DNR Regional Biologist for south Florida, (407/793-5666); University of Florida, IFAS, Center for Aquatic Plants (904/392-9613); Fort Lauderdale REC (305/475-8990); or DNR, Tallahassee (904/488-5631) so the plants can be identified and destroyed if found to be catclaw mimosa.