

To Whom It Concerns:

Attached is the interim/progress report for the IAT funded visit to Mexico, August 2005, to evaluate the largest commercial pine plantation in Mexico for problems with ips bark beetle outbreaks. Specifically, the goals of the project were:

1. assess pheromone preference of species to determine the most effective combination for survey and management.
2. determine flight periods for ips beetles and possible changes in flight seasonality as well.
3. develop a set of recommendations for managing pine plantations prone to ips bark beetle attack.

Two site visits were planned in order to conduct the field visits and deploy/monitor the pheromone traps. This trip report covers the work completed during the first of these visits, which included an initial assessment of the situation and setup of a pheromone baited trapping array. The second visit is being planned for mid-February, 2006, and will include laboratory time to look at the trap catches and site visits to discuss potential management guidelines in light of the species found.

This project is a good opportunity for the Forest Service to provide needed assistance and expertise to Mexico, and to strengthen ties between the forest health programs of the two countries. In addition, information gathered on insects common to both countries benefits development of future management strategies. Opportunities for collaboration and experience may be particularly important as we look at the potential of inheriting forest health problems (including changed behaviors of native pests) due to shifts in global climate patterns and increased international commerce.

CONAFOR has committed a number of people to conduct much of the field and lab work but requests expertise in planning and evaluating the project, and in providing management recommendations to this important plantation project (the only large pine plantation in MX). Beth and I thank IAT for lending support to this project.

Sincerely,

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## TRIP REPORT ON IPS IN INTENSIVELY MANAGED PINE PLANTATIONS IN JALISCO, MEXICO

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### Background

Large-scale, intensive even-age management of native pine forests using artificial regeneration is relatively new in Mexico. In 1997, Compañía Industrial de Atenquique (C.I. Atenquique) established the first industrial plantations of native pine in the State of Jalisco. C.I. Atenquique, owned by a large pulp and paper company that manages an assortment of pulp mills, paper plants, land concessions, and land holdings throughout Mexico and the southern United States, manages its southern Jalisco land commissions primarily for fiber production. Since 1997, the number of native pine plantations established by the company has steadily increased. C.I.

Atenquique plans to manage for a continuous yield of high-quality fiber utilizing intensive forestry management techniques including planting, pruning, thinning, and short rotations. To this end, C.I. Atenquique regenerates harvested areas with *Pinus douglasiana*,



Young pine plantation at C.I. Atenquique

principally, and to a lesser extent, with *Pinus pseudostrabis*. Preference of *P. douglasiana* is based on its fast growth, high quality fiber, and resistance to *Dendroctonus* bark beetle attack. Out of the ten or so species of pine native to this area, these two species are considered most desirable for fiber production. Current management plans call for a first-entry weeding and pruning at age 4-6 years, a second-entry thinning and pruning at age 7-8 years, and final harvest at approximately 28 years of age.

In 2004, Ips outbreaks occurred in several of the recently thinned and pruned 7-8 year old plantations following their second-entry thinning and pruning. The company responded by promptly removing and burning any Ips-infested trees and on-site slash in the outbreak areas. Concerned about the implications of these outbreaks for the company's future intensive management program, C.I. Atenquique asked Comisión Nacional Forestal (CONAFOR) for help developing a monitoring program for Ips beetles in their pine plantations. Because relatively little is known about the biologies, semiochemicals, impacts, and management of the various Ips species associated with intensively managed pine plantations in Mexico, CONAFOR contacted Forest Health Protection for support in

developing an Ips management program. At the time, it was suspected that *Pseudips mexicanus* was the species of concern and that management might be obtained through pheromone-based trapping and timing of activities around this species' peak flights.

## **Purpose**

In August, 2005, the International Activities Team (IAT) provided funding for Brytten Steed and Beth Willhite to travel to Jalisco to assist CONAFOR in developing an Ips management program for young pine plantations in the areas managed by C.I. Antequique. The primary purposes of the trip were to gather information about the history of the outbreaks, gain understanding of the goals and management of the plantations, roughly assess the health of the trees, gather beetles for identification, and to establish field trapping sites. Trapping data was obtained to a) further determine the species present, b) test the attractiveness of several pheromone lure compounds to various Ip species and c) track Ips flight patterns over time. It was anticipated that a second follow-up trip would occur in spring, 2006.

## **Itinerary Highlights**

### **Friday, August 26**

We arrived in Guadalajara late in the day. We were met at the airport and accompanied during the remainder of our stay by Francisco Bonilla Torres, a forest health specialist at CONAFOR.

### **Saturday, August 27**

Saturday morning, we drove south from Guadalajara to Ciudad Guzman, where we met with Jaime Villa-Castillo, Director of CONAFOR. Jaime took us on a tour of the tree nursery where the pine seedlings planted in the Atenquique plantations are grown. This modern nursery is containerized, with automatic irrigation accomplished using a system of overhead boom sprayers mounted on track "robots." Fertilizers are added to the irrigation water. The seedlings are grown in friable mulch created from pine bark compost amended with beneficial microorganisms and nitrogen. At planting time, the seedlings are transported to the field in covered trucks.



Jaime Villa Castillo at the nursery that provides planting stock to C.I. Atenquique.

This nursery grows many local species of native pine and one eucalyptus species. Pine species grown here include *Pinus michoacana*, *P. pseudostrobus*, and *P. douglasiana*. All of the seedlings in the nursery appeared very healthy and well grown, with good form and root development.

Following the nursery tour, Francisco took us to the coastal city of Manzanillo for the night. On the way he showed us the location of the C.I. Atenquique paper mill and the some of the forested areas in which we would be working during the coming week.

### **Sunday, August 28**

We returned from Manzanillo to Ciudad Guzman and prepared for Monday's field work and meeting with CONAFOR and C.I. Atenquique staff. We were based in Ciudad Guzman during the remainder of our trip.

### **Monday, August 29**

On Monday morning, Jamie, Francisco, Brytten, and Beth met with Jalisco C.I. Atenquique personnel at the main office at the paper plant in Atenquique, located about one-half hour south of Ciudad Guzman. We met with the company manager, Francisco Ochoa and several key staff. Humberto Albarran, timber supply manager, presented a briefing on the company's history, management, and current Ips situation.

Following the meeting, we traveled to field locations in the Secction Correlitos. Several C.I. Atenquique employees accompanied us that afternoon as well as at various times throughout the rest of the week, including Humberto Albarran, Manuel Medina, Hermelino Galiana, and Ruben Niebes. We saw harvest activities, reserve areas (unharvested tracts of natural forest), and pine plantations of various ages and sizes growing on a variety of sites. In addition, we reconned the area for potential trap site locations, and collected Ips samples from fresh harvest slash and windfalls.



Extracting bark beetles from infested material

### **Tuesday, August 30**

We spent the day in Sección Coloradas establishing three trap plots and collecting Ips samples. We visited one of the 2004 Ips outbreak sites, and established one of the trap plots in an adjacent reserve area. We also collected beetle samples at the outbreak site from on-site thinning and pruning slash and from dead standing trees that were killed by Ips during the outbreak. The dead standing trees that we collected from were quite small, ranging from 1.3 to 2.1 inches dbh. Later that day at another location, we collected Ips samples from two currently attacked plantation trees (2.3 and 3.2 inches dbh), one still

green and one fading red. That evening, we worked in the CONAFOR lab in Ciudad Guzman to identify our collection specimens to species and gender. We identified at least four different Ips species and are waiting species conformation from a Mexican taxonomist. Although some of the slash pieces collected from were either *Pinus oocarpa* or other unidentified pine species, most of our collections were from *Pinus douglasiana*. Most of the slash on site were remains from harvesting of the natural (primary or secondary) forest.

### **Wednesday, August 31**

We returned to Sección Corralitos and established three trap plots. We saw the site where the 2004 Ips outbreak first started.

### **Thursday, September 1**

We established four trap plots in Sección Pinabetes y Sauces and collected Ips samples from a plantation that had recently killed plantation trees and from some recent pruning slash. That evening we worked at the CONAFOR lab to identify our new collections, and to prepare specimen samples for verification by a taxonomist at (????). We met over dinner with the C.I. Atenquique staff to discuss our findings and future project work.



Hanging monitoring traps at C.I. Atenquique

### **Friday, September 2**

We visited the CONAFOR office in Guadalajara to meet with Jamie and discuss the results of our visit and future project work, then departed for return travel to the United States.

## **Preliminary Findings**

- We identified at least 4 bark beetle species active in logging slash or in plantation seedlings. Species confirmation has been conducted by a professional Mexican taxonomist and we are waiting for this information to be forwarded so that we may continue our evaluation of management options.

- Trapping conducted since our visit indicates that beetles were still flying in December.
- We noted several additional insects and diseases active in the plantations. Many are of little importance, but a few have the potential to stress large numbers of trees and affect the occurrence of bark beetle outbreaks.

## Discussion and Preliminary Recommendations

- Due to the presence of several bark beetle species having flights during most times of the year, management recommendations likely cannot be tailored to the specific beetle species. Rather, an integrated management approach that increases tree health and decreases host material will be needed.
- We are working to provide information on slash management as is recommended in the US. However, due to social, financial, and possibly biological differences in Mexico, we will have to work with CONAFOR specialists to better tailor recommendations to the situation at Atenquique (e.g., most work is done by machete with hand labor being more available than equipment).
- Tree/stand health issues related to even-age monocultures, planting of off-site species, high stand density, and questions of the role of pruning should be discussed. These issues, however, are ultimately affected by management aimed at fiber production. It is our understanding that paper quality (and thus market price) is best when processed fibers come from the same species, of the same age, and from the same part of the tree (e.g., top vs. lower bole).
- Recommendations of proper planting densities and thinning levels are likely beyond the scope of this particular assistance project. However, we recommend that C.I. Atenquique make it a priority to conduct the long-term research projects (e.g., test stands) necessary to obtain the needed data. Because of the variety of site conditions that exist in the area, these test stands should be grown over the range of conditions found on lands managed by Atenquique (e.g., some have *P. douglasiana* occurring naturally while others are naturally *P. oocarpa* stands [a species indicative of poorer soils]).