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STERILE INSECT RELEASE FOR PINK BOLLWORM ERADICATION - THE FIRST TWO YEARS

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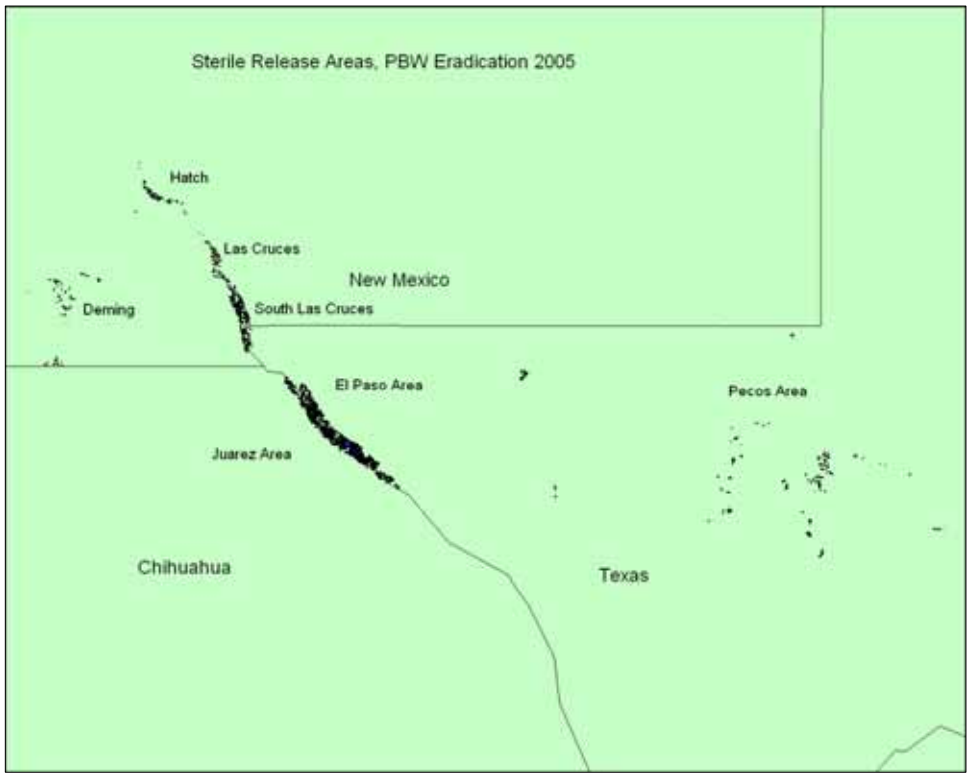
Abstract

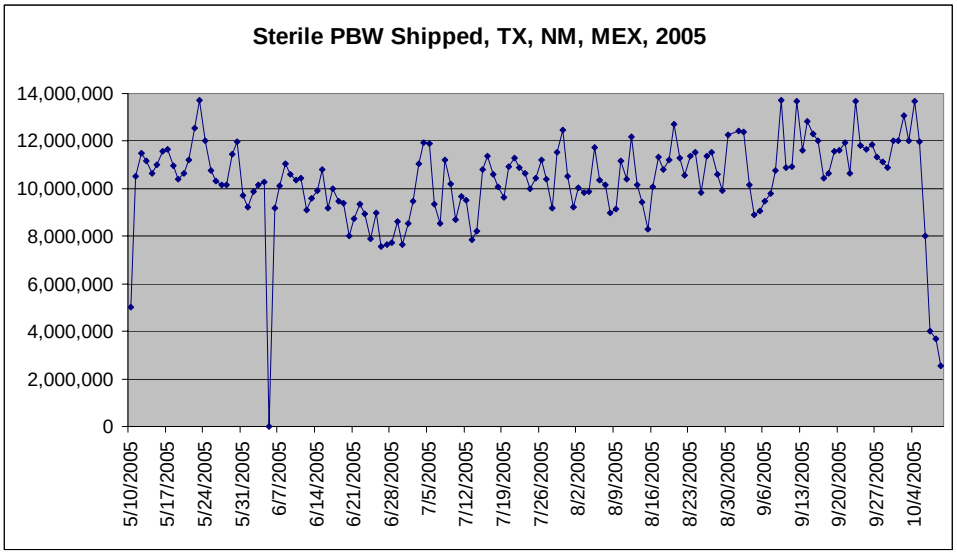
Sterile Insect Technology is a critical component of the area-wide pink bollworm (*Pectinophora gossypiella* (Saunders)) eradication program in the southwestern US and northern Mexico. The program involves growers, state, federal and international cooperators, and was proposed by the National Cotton Council's Pink Bollworm Action Committee. Sterile insects were released over cotton fields for the entire 2 year growing season. Populations of wild and sterile moths were monitored with pheromone baited traps and boll samples. The role and effects of releasing sterile moths is discussed.



Methods

Sterile PBW are mass reared in Phoenix, Arizona and are shipped chilled each day. Eight to 14 million were shipped each day to El Paso, TX, thence to Fabens, TX where they were held overnight for release the next day in 5

releases from of 3 aircraft outfitted specially for that task. Then entire zone was 150 x 330 miles. Data was collected of number of moths released in 3 states - New Mexico, Chihuahua, and Texas (in two areas, El Paso and Pecos). Within each area, the moths were released over the susceptible (non-Bt) fields with the highest native PBW trap catches. Moths were released exclusively over non-Bt fields except for a few, primarily late season, releases directed at isolated Bt fields, for resistance management. Most Bt fields were adjacent to non-Bt/release fields and the moths moved freely between the varieties of cotton, so those fields were very well protected from development of resistance. Pheromone baited sticky traps were placed in each cotton field and monitored weekly. Bolls were collected from a selection of fields in each state.



Analysis

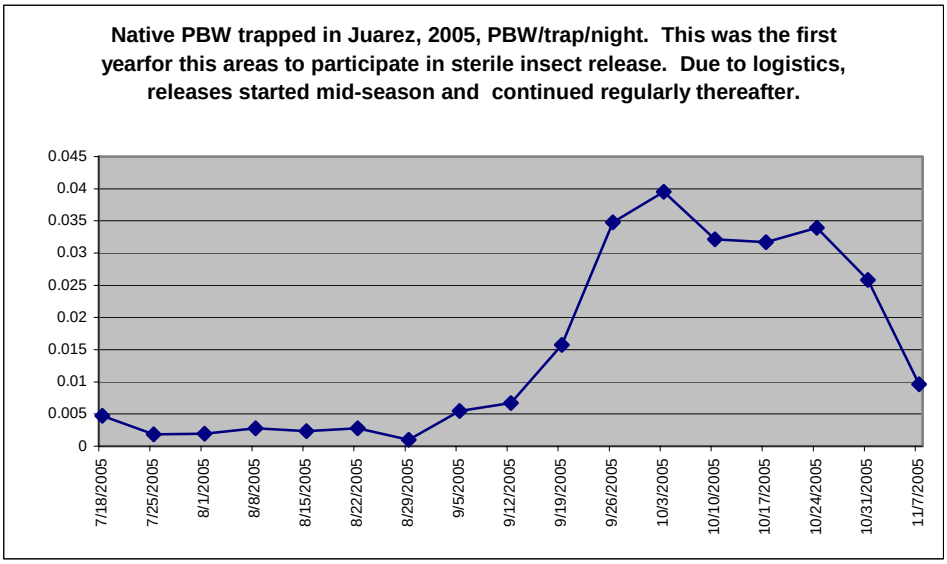
There are many ways to analyze and use the data collected during a sterile insect technology (SIT) program. There are two populations of interest – the native pink bollworm adults and larvae and the sterile adult population, both released and recaptured. The charts show simple numbers of moths released by flight area, native and sterile insects trapped, the ratio of sterile to native insects trapped, sterile and native PBW trapped by type of cotton.

Discussion

Since this was a cooperative project, involved managers came from several organizations and with various experiences with Pink Bollworm. Sterile Insect Technology is a very different method from chemical control. It is less geographically specific, is subject to variation in supply, depends on weather for successful distribution, uses specialized aircraft and equipment, and requires extra time and skill to identify in a week old sticky trap! The team worked well together, will great patience and sharing of skills and knowledge. The year proved successful and has set the stage for further population suppression necessary for eradication of this exotic and damaging pest.

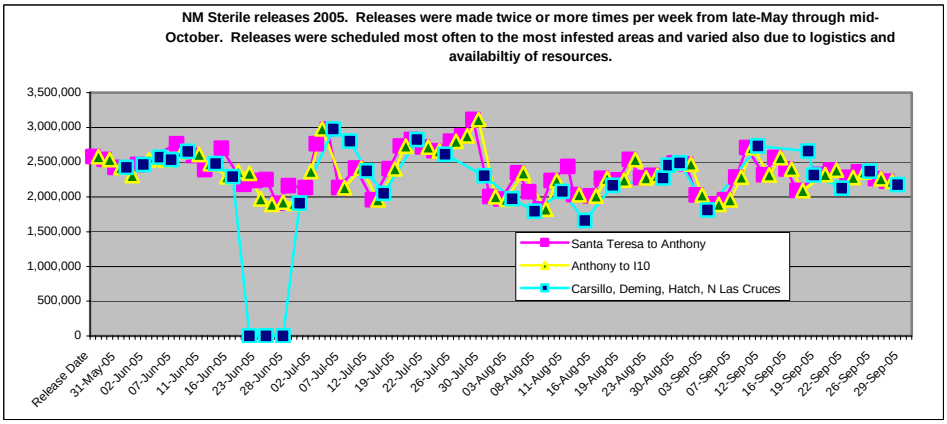
Juarez Valley, Chihuahua

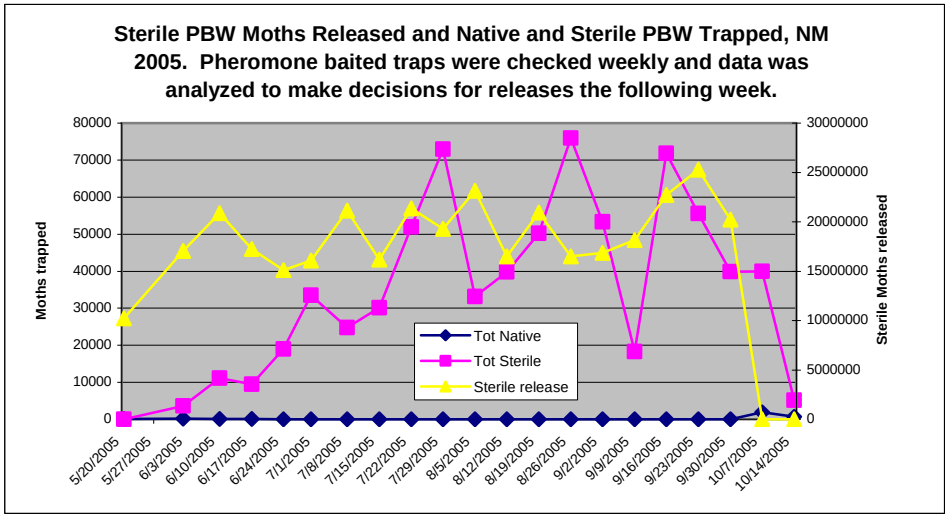
First partial year of sterile release - August 3 – September 29, 4 days per week. 19% of non-Bt (all fields with trap catches) were treated with PBL rope. There were 322 non-Bt fields, amounting to 13,885 acres or 71% non-Bt. There were 132 fields of Bt, amounting to 5,671 acres, or 29% Bt. Therefore, there were 454 total fields, amounting to 19,556 total acres included in the eradication area in the Juarez Valley.

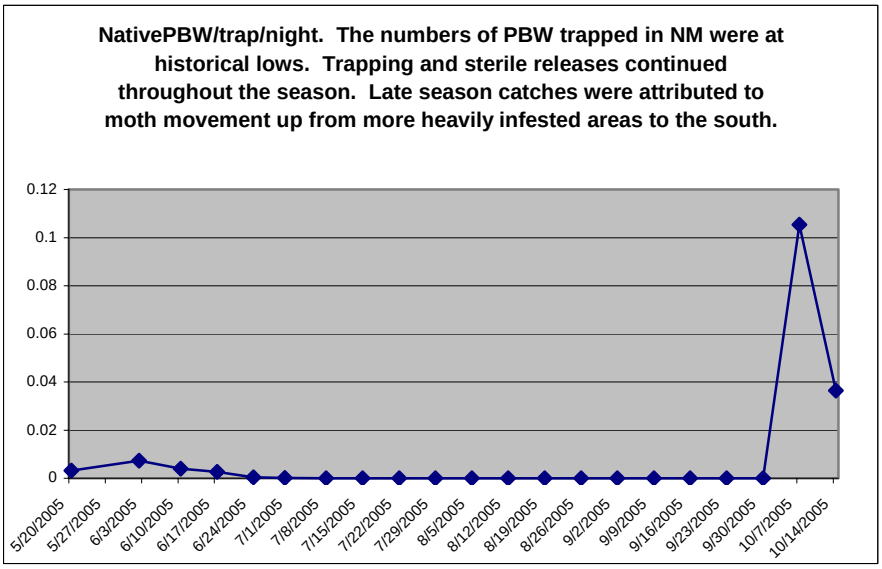


New Mexico

This was the second year of sterile release for most regions in New Mexico, but the first year for south Las Cruces. The New Mexico Boll Weevil/PBW Eradication program was active in the Deming, Hatch and Las Cruces areas, all the way south to their borders from May 26- September 30, 2005. There were 749 fields, amounting to 12,334 acres or 57% non-Bt in the state. There were 525 fields, amounting to 9,170 acres or 43% Bt. There were 1,274 fields total amounting to 21,507 acres total cotton in the New Mexico eradication program.

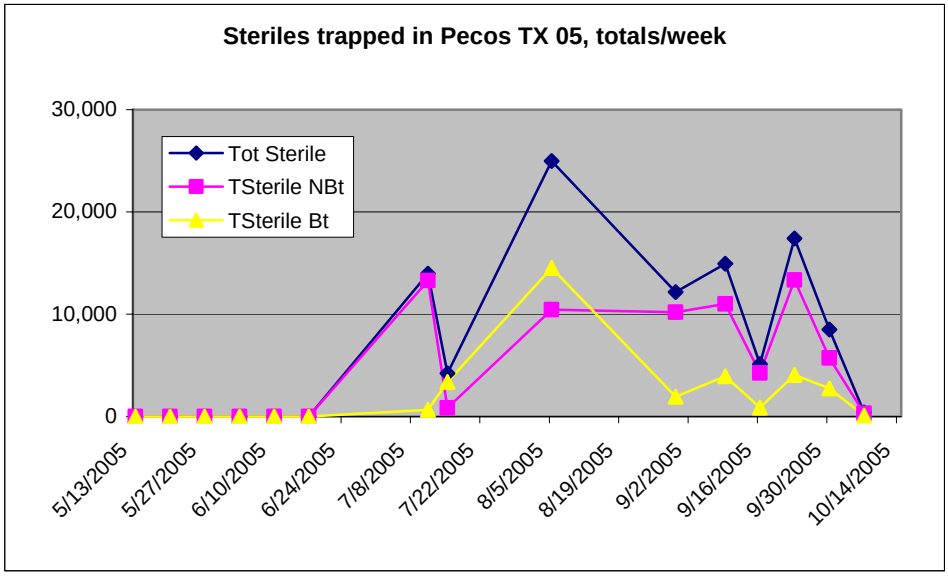


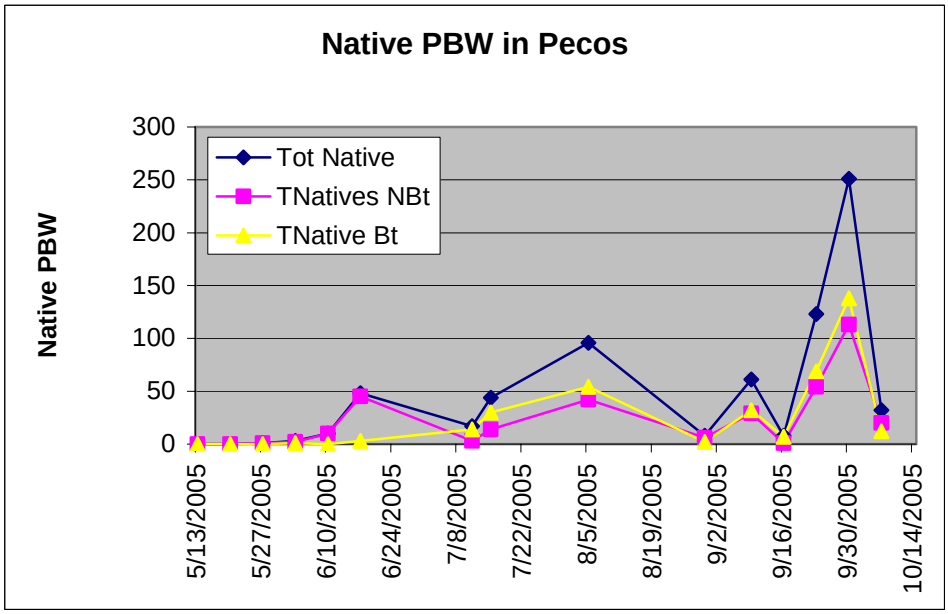


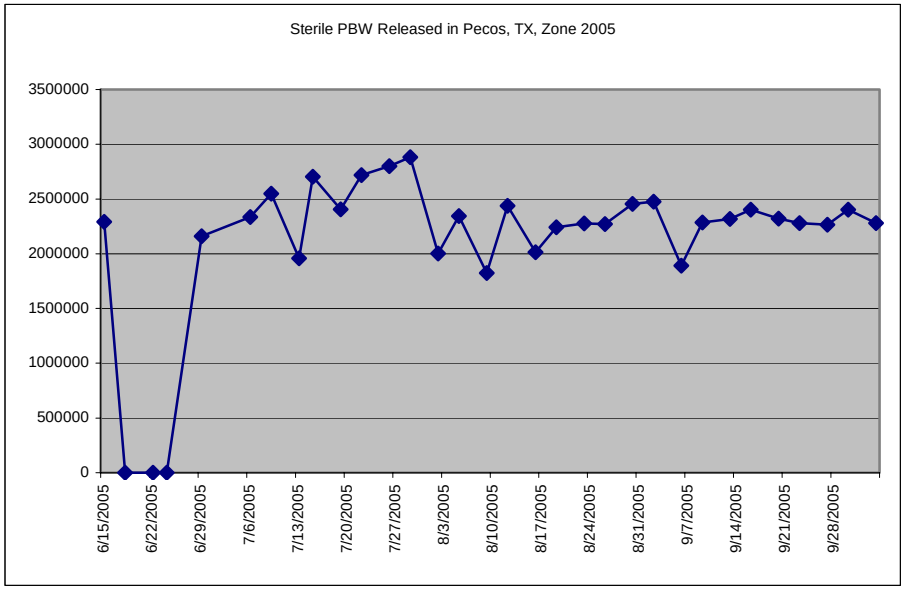


Pecos Area, Texas

This was the second year for the Pecos area to receive sterile release. Regular releases were made from June 29 to October 4, 2005. There were 83 non-Bt fields amounting to 7445 acres or 56% of the total. There were 71 Bt fields amounting to 5899 acres or 44%. There were 154 fields total amounting to 13,344 total acres in the Pecos area. This is a geographically diverse area with a long ferry flight from Fabens. It received releases twice per week.

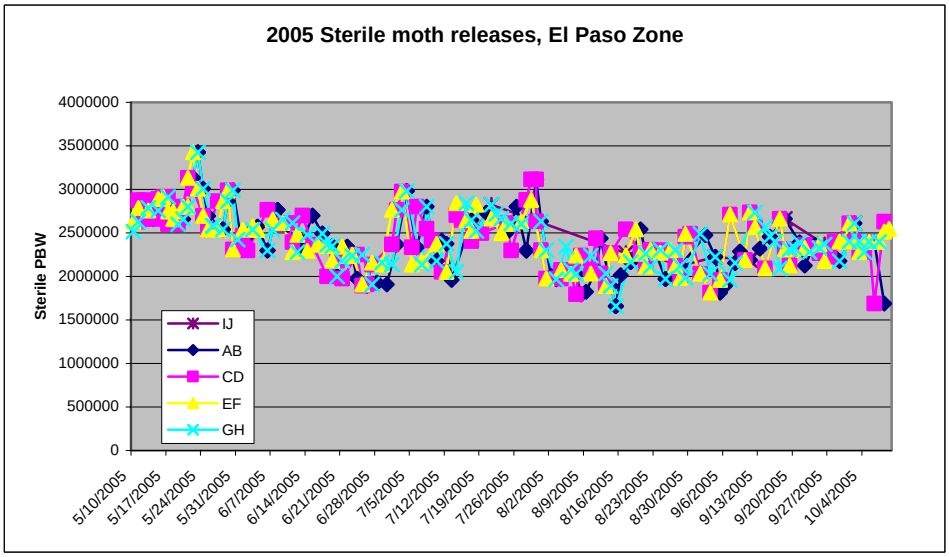

Steriles trapped in Pecos TX 05, totals/week
30,000
20,000
10,000
0
Tot Sterile
TSterile NBt
TSterile Bt
5/13/2005
5/27/2005
6/10/2005
6/24/2005
7/8/2005
7/22/2005
8/5/2005
8/19/2005
9/2/2005
9/16/2005
9/30/2005
10/14/2005

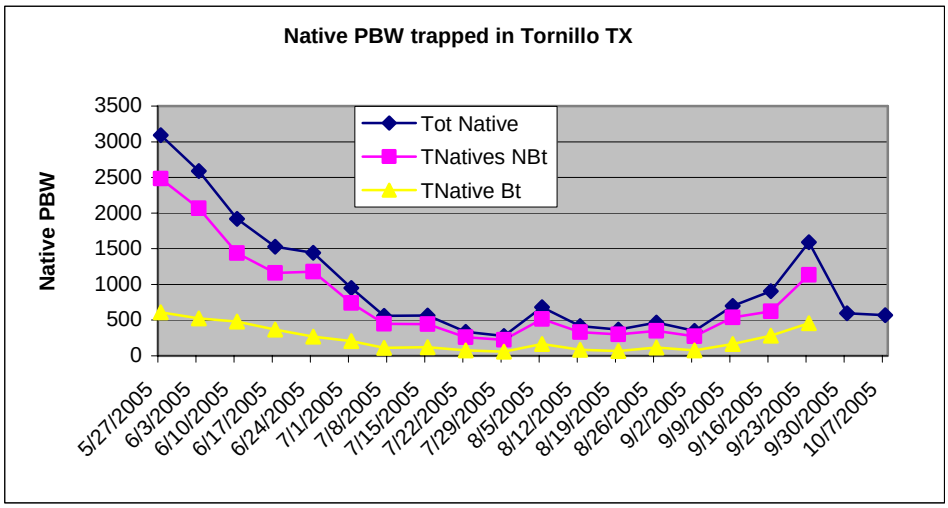

Native PBW in Pecos
Native PBW
300
250
200
150
100
50
0
Tot Native
TNatives NBt
TNative Bt
5/13/2005
5/27/2005
6/10/2005
6/24/2005
7/8/2005
7/22/2005
8/5/2005
8/19/2005
9/2/2005
9/16/2005
9/30/2005
10/14/2005



El Paso Valley, Texas

This was the first year for the entire El Paso Valley to receive sterile release. The lower portion of the valley received limited releases in 2004. In 2005, since this is the largest non-Bt acreage, 572 fields amounting to 14,097 acres or 47% of the total, it received releases of insects 5 times per week. There were 657 Bt fields amounting to 16,192 acres or 53%. There were 1229 total fields and 30,289 total acres




Native PBW trapped in Tornillo TX
Native PBW
3500
3000
2500
2000
1500
1000
500
0
Tot Native
TNatives NBt
TNative Bt
5/27/2005
6/3/2005
6/10/2005
6/17/2005
6/24/2005
7/1/2005
7/8/2005
7/15/2005
7/22/2005
7/29/2005
8/5/2005
8/12/2005
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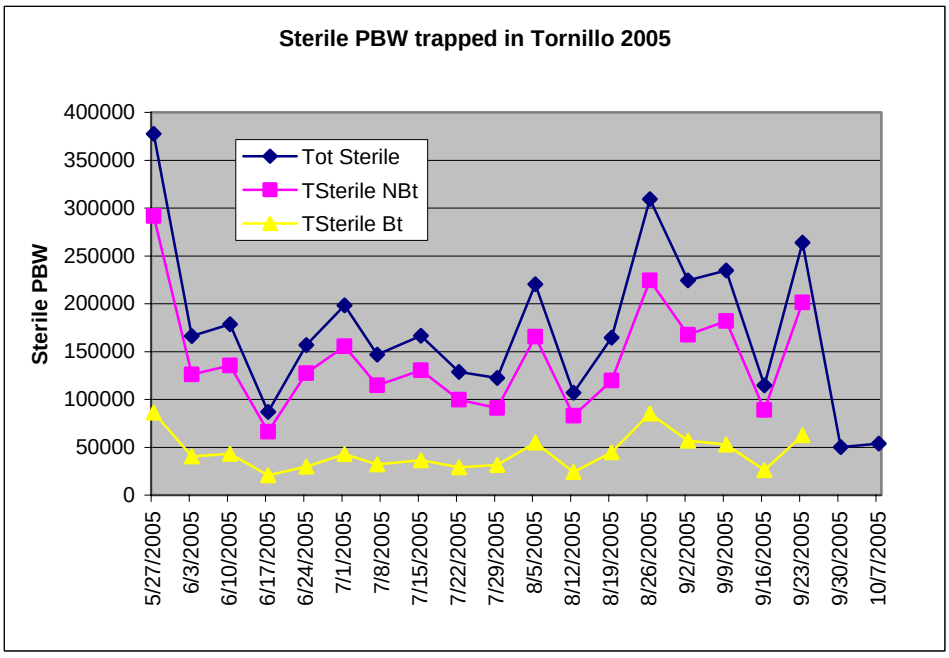
9/16/2005
9/23/2005
9/30/2005
10/7/2005


Sterile PBW trapped in Tornillo 2005
Sterile PBW
400000
350000
300000
250000
200000
150000
100000
50000
0
Tot Sterile
TSterile NBt
TSterile Bt
5/27/2005
6/3/2005
6/10/2005
6/17/2005
6/24/2005
7/1/2005
7/8/2005
7/15/2005
7/22/2005
7/29/2005
8/5/2005
8/12/2005
8/19/2005
8/26/2005
9/2/2005
9/9/2005
9/16/2005
9/23/2005
9/30/2005
10/7/2005