Statewide Survey of the Distribution of Q Biotype of *Bemisia tabaci*

2007 IPM Grant Progress Report

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Please Note: This project is still ongoing, largely because of the nature of the project------whitefly samples from poinsettia, on which Q biotype whiteflies are usually found, can only be collected in next 2-3 months (November 2007 to January 2008). Another reason is that this grant was awarded in summer 2007 rather than early in the year. Thus, this is not a final but a progress report of the project.

Project objective:

The overall objective of this project is to conduct a statewide survey of the distribution of the Q biotype whitefly throughout the lower deserts and municipal areas of Arizona. As originally proposed, we have been using 2007 funding to: 1) analyze the remaining whitefly samples collected in 2006, 2) collect and analyze new samples in 2007.

Activities / Results:

1. In 2006, we collected 55 whitefly samples in total, including 18 from cotton, 10 from melon, 2 from brassicae, 1 from lettuce, 5 from hibiscus, 2 from lantana, 1 from helianthis, 13 from poinsettia (Table 1).
2. All 2006 samples have been analyzed using the *VspI*-based *mtCOI* (mitochondrion cytochrome oxidase I) CAPS (cleaved amplified polymorphic sequences) method. Only sample 06-124, which was collected from poinsettia in Tucson on November 29, 2006, is Q biotype (Table 1). All other samples are B Biotype, regardless of locations and crops (Table 1).
3. A Q biotype lab colony designed as PO6 has been established from the only Q biotype sample 06-124.
4. Resistance bioassays show that PO6, as expected, is resistant to multiple insecticides including pyriproxyfen and neonicotinoids.
5. Host plant adaptation experiments show that PO6 Q whiteflies can adapt to and colonize on poinsettia, cotton, melon, and cowpea, demonstrating that the Q biotype whitefly is able to establish populations on field crops.
6. In 2007, we have already collected and preserved 44 whitefly samples from field crops, including 34 from cotton, 9 from melon, 1 from B. oleracea (Table 2). Sample collections from poinsettia and other ornamental plants are currently underway.

Table 1. 2006 Arizona whitefly biotype survey: sample collection and biotype determination

Sample #	Source	Location	Host	Date collected	Date preserved	Total number tested	Number of B biotype present	Number of Q biotype present
06-13	Field	Holtville, AZ	Cotton	8/25/06	9/1/06	5	5	0
06-16	Field	Arizona City, AZ	Cotton	2006-8-31	2006-9-6	5	5	0
06-17	Field	Eloy, AZ	Cotton	2006-8-31	2006-9-6	4	4	0
06-21	Field	Mohave, AZ	Cotton	2006-9-16	2006-9-20	5	5	0
06-22	Field	Parker Vly, AZ	Cotton	2006-9-17	2006-9-20	5	5	0
06-25	Field	Safford, AZ	Cotton	2006-9-30	2006-10-4	5	5	0
06-27	Field	Queen Creek, AZ	Cotton	2006-9-30	2006-10-4	5	5	0
06-28	Field	Parker Vly, AZ #2	Cotton	2006-10-6	2006-10-11	5	5	0
06-30	Field	Marana, AZ	Cotton	2006-10-10	2006-10-12	5	5	0
06-112	Field	Wellton, AZ	Cotton	2006-6-25	2006-6-29	5	5	0
06-116	Field	Buckeye, AZ	Cotton	2006-7-10	2006-7-16	5	5	0
06-118	Field	Maricopa Ag. Ctr, AZ	Cotton	2006-8-7	2006-8-13	5	5	0
06-119	Field	Salt River Res, AZ	Cotton	2006-8-31	2006-8-31	5	5	0
06-120	Field	Magma, AZ	Cotton	2006-8-31	2006-8-31	5	5	0
06-121	Field	Stanfield, AZ	Cotton	2006-8-31	2006-9-6	5	5	0
06-122	Field	Harquahala Vly, AZ	Cotton	2006-9-24	2006-9-28	5	5	0
06-123	Field	Paloma, AZ	Cotton	2006-9-24	2006-9-24	5	5	0
06-117	GH	CAC-GH/ Tuc	Cotton	2006-8-1	2006-8-10	5	5	0
06-32	Field	Imperial Valley, CA	brassicae	2006-11-7	2006-11-7	5	5	0
06-15	Field	South Gila Valley, AZ	brassicae	2006-8-24	2006-9-6	5	5	0
06-111	GH	Campus Ag Ctr, Tuc	Lettuce	2006-6-15	2006-6-22	15	15	0
06-34	Field	Holtville, CA	Melons	2006-11-7	2006-11-7	5	5	0
06-29	Field	Vicksburg, AZ	Melons	2006-10-6	2006-10-12	5	5	0
06-106	Field	Tacna, AZ	Melons	2006-6-12	2006-6-15	10	10	0
06-107	Field	South Gila Valley, AZ	Melons	2006-6-12	2006-6-15	10	10	0
06-108	field	Somerton, AZ	Melons	2006-6-12	2006-6-12	10	10	0
06-109	field	Gadsden, AZ	Melons	2006-6-12	2006-6-12	5	5	0
06-110	field	Dome Valley, AZ	Melons	2006-6-12	2006-6-12	4	4	0
06-113	field	Avondale, AZ	Melons	2006-7-6	2006-7-13	10	10	0

06-114	field	Litchfield Prk, AZ	Melons	2006-7-6	2006-7-13	5	5	0
06-115	field	Harquahala, AZ	Melons	2006-7-6	2006-7-13	10	10	0

06-11A	retail	Flagstaff	helianthis	2006-7-15	2006-7-22	4	4	0
06-104	retail	Target/Tuc	hibiscus	2006-5-31	2006-5-31	10	10	0
06-31A	retail	Home Depot (tucs)	hibiscus	2006-11-5	2006-11-9	5	5	0
06-31B	retail	Home Depot (tucs)	hibiscus	2006-11-5	2006-11-9	4	4	0
06-31C	retail	Home Depot (tucs)	hibiscus	2006-11-5	2006-11-9	4	4	0
06-31D	retail	Home Depot (tucs)	hibiscus	2006-11-8	2006-11-9	5	5	0
06-10	retail	Kingman, AZ	Lantana	2006-7-15	2006-7-22	3	3	0
06-105	retail	Home Depot (tucs)	Lantana	2006-5-31	2006-6-8	10	10	0

06-41	retail	Home Depot (Chndlr)	poinsettia	2006-12-13	2006-12-14	4	4	0
06-43	retail	Nate's Farm/Phx	poinsettia	2006-12-13	2006-12-14	4	4	0
06-44	retail	Harper's/Mesa	poinsettia	2006-12-5	2006-12-6	5	5	0
06-45	retail	Green Things/Tuc	poinsettia	2006-12-18	2006-12-18	5	5	0
06-46	retail	Gardener's World/Phx	poinsettia	2006-12-19	2006-12-26	5	5	0
06-47	retail	Quality Grwrs/Phx	poinsettia	2006-12-19	2006-12-26	4	4	0
06-48	retail	Whitfield/Glendale	poinsettia	2006-12-19	2006-12-20	5	5	0
06-49	retail	Home Depot/Tuc	poinsettia	2006-12-27	2007-1-1	5	5	0
06-50	retail	Harlows Gardens/Tuc	poinsettia	2006-12-27	2007-1-1	5	5	0
06-124	**retail**	**Lowes (tuc)**	**poinsettia**	**2006-11-29**	**2006-12-10**	**12**	**0**	**12**
06-126	retail	Target (Roger Rd/Tuc)	poinsettia	2006-11-30	2006-12-10	4	4	0
06-128	retail	Harlows Gardens/Tuc	poinsettia	2006-12-11	2006-12-14	5	5	0
06-130	retail	Mesquite Valley/Tuc	poinsettia	2006-12-12	2006-12-14	4	4	0

7. Biotype determination of 2007 samples using CAPS method is currently underway.
8. Communicating survey results with the decision makers/stakeholders and end-users including extension agents, cotton incorporated, ornamental industry, and growers through the Arizona Cooperative Extension Network (http://www.ag.arizona.edu /extension/) and the Arizona Pest management Center (**http://cals.arizona.edu/apmc/**)

Table 2. 2007 Arizona whitefly biotype survey: sample collection

sample #	location	host	date collected	date preserved
07-01	Somerton	cotton	2007-8-30	2007-8-30
07-03	Dome Valley	cotton	2007-8-30	2007-8-30
07-04	North Gila Valley	cotton	2007-8-30	2007-8-30
07-07	Wellton	cotton	2007-8-31	2007-9-6
07-17	Avondale	cotton	2007-9-28	2007-9-28
07-18	Tonapah	cotton	2007-9-28	2007-9-28
07-19	Vicksburg	cotton	2007-9-28	2007-9-28
07-21	Parker	cotton	2007-10-5	2007-9-29
07-22	Parker	cotton	2007-10-5	2007-9-29
07-25	Cibola	cotton	2007-9-29	2007-9-29
07-26	Ripley, CA	cotton	2007-9-29	2007-9-29
07-27	Wenden	cotton	2007-9-29	2007-9-29
07-29	Solome	cotton	2007-9-29	2007-9-29
07-101	Tacna	cotton	2007-7-30	2007-8-3
07-102	North Gila Valley	cotton	2007-7-30	2007-8-3
07-103	Gadsden	cotton	2007-7-30	2007-7-30
07-105	Goodyear	cotton	2007-8-6	2007-8-9
07-106	Litchfield	cotton	2007-8-6	2007-8-9
07-107	Casa Blanca	cotton	2007-8-6	2007-8-6
07-108	Mohawk Valley	cotton	2007-8-13	2007-8-13
07-109	Dome Valley	cotton	2007-8-13	2007-8-16
07-111	Coolidge	cotton	2007-8-20	2007-8-24
07-112	Maricopa Ag Ctr	cotton	2007-8-31	2007-9-6
07-115	Casa Grande	cotton	2007-9-7	2007-9-7
07-116	La Palma	cotton	2007-9-7	2007-9-7
07-117	Picacho	cotton	2007-9-7	2007-9-7
07-118	Casa Grande	cotton	2007-9-14	2007-9-14
07-119	Queen Creek	cotton	2007-9-14	2007-9-14
07-120	Queen Creek	cotton	2007-9-14	2007-9-14
07-121	Picacho	cotton	2007-9-14	2007-9-14
07-122	Marana	cotton	2007-9-21	2007-9-21

07-123	Picacho	cotton	2007-9-21	2007-9-21
07-124	Laveen	cotton	2007-10-12	2007-10-18
07-125	Avondale	cotton	2007-10-12	2007-10-12
07-02	Dome Valley	melons	2007-8-30	2007-8-30
07-09	Holtville, CA	melons	2007-9-20	2007-9-27
07-20	Vicksburg	melons	2007-9-28	2007-9-28
07-23	Palo Verde	melons	2007-9-29	2007-10-1
07-28	Wenden	melons	2007-9-29	2007-9-29
07-104	Yuma	melons	2007-7-30	2007-8-3
07-110	Wellton	melons	2007-8-13	2007-8-16
07-113	Stanfield	melons	2007-8-31	2007-9-6
07-114	Stanfield	melons	2007-8-31	2007-8-31
07-12	Bard, CA	B. oleracea	2007-9-20	2007-9-20

Leveraged Resources

The total cost of collecting and analyzing whiteflies for this project is about $30,000. The $6,500 from APMC is leveraged with $24,000 in funds from other sources, including cotton incorporated.

Outcomes / Impacts

1. A network for the statewide survey of B / Q biotype whiteflies has been established.
2. The statewide whitefly biotype survey has increased our knowledge and understanding of the statewide distribution, spreading, host crop suitability, and establishment of Q biotype in Arizona. Such information is extremely valuable for the decision makers/stakeholders to asses the severity of the threat posed by this new biotype and the risk of its establishment in Arizona and design rational strategies towards the Q biotype threat accordingly.
3. Based on the diagnostic technique and the established Arizona Q biotype survey network, we plan to expand this project to national or regional level though the ipm PIPE program next year.