

Insecticide resistance and biotype status of whiteflies (*Bemisia tabaci*) from Xinjiang Uygur Autonomous Region, China

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Agriculture accounts for c. 45% of the economy of Xinjiang, and has expanded dramatically over the last ten years. Over 30% of China's cotton production is now based in Xinjiang; other important crops are vegetables, grapes and ornamentals.



Protected vegetables in Xinjiang



Indoor flower-market in Xinjiang

The whitefly, *Bemisia tabaci* (Gennadius), attacks a wide range of crops and is considered an increasingly serious threat to agriculture in Xinjiang. It was first reported there in 1998, initially on poinsettia, but has since been found on cotton and in vineyards. This work is investigating the biotype and insecticide resistance status of whiteflies sampled in 2004 and 2005 from different crops in Xinjiang.

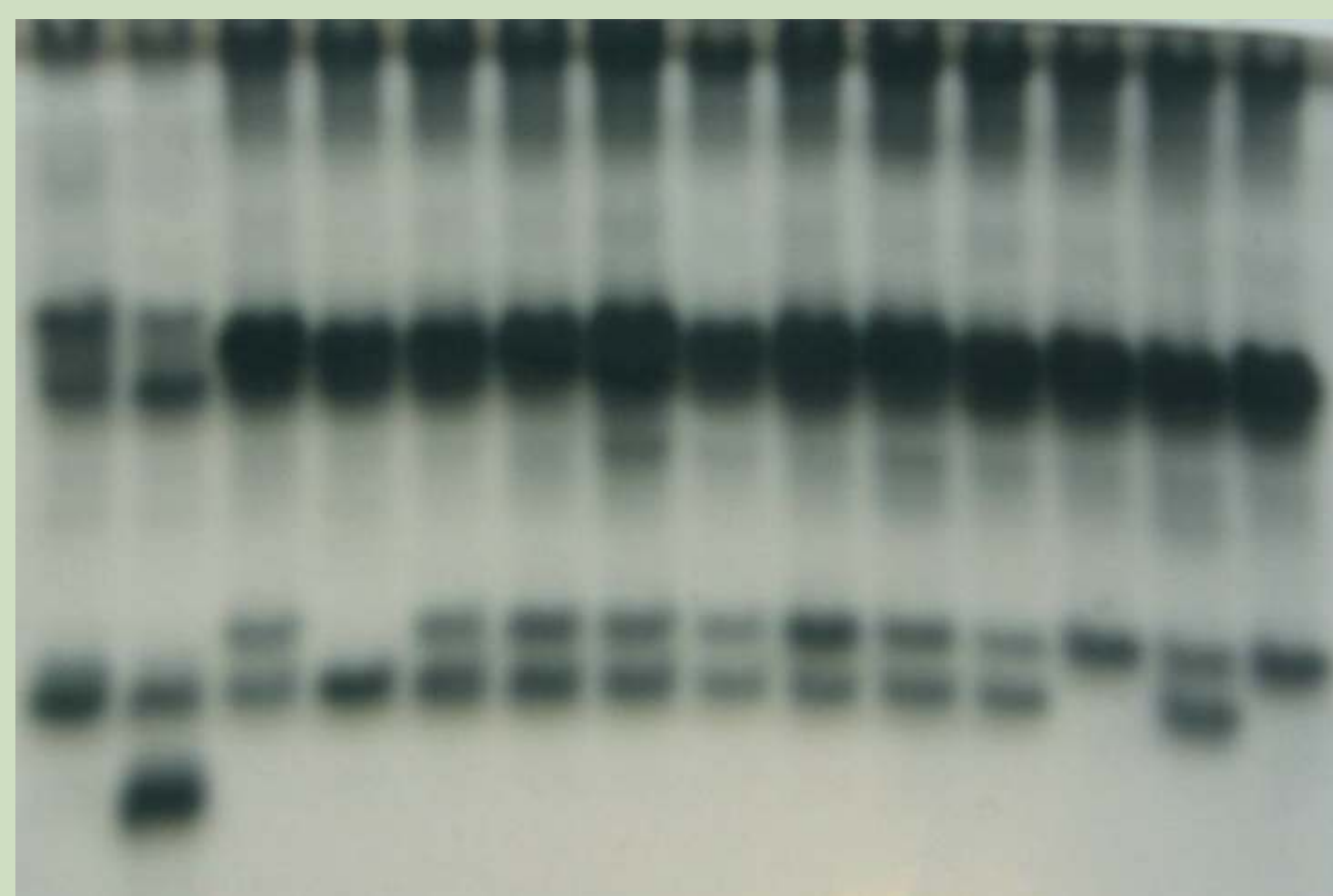


B. tabaci



Crop damage by *B. tabaci*

The two most damaging biotypes of *B. tabaci* are the 'B' and 'Q' biotypes. The B-type has a worldwide distribution. The Q-type was largely restricted to the Mediterranean area but has recently been detected in the U.S.A and some regions of China. Biotype status can be diagnosed from esterase banding patterns using polyacrylamide gel electrophoresis (PAGE).



Esterase banding patterns of *B. tabaci* from Xinjiang with two 'Q' standards on the left and two 'B' standards on the right.

All individuals tested in all samples from Xinjiang have been confirmed as B-types. This is currently the common biotype in China. Around the world, B-types differ greatly in the extent and breadth of resistance to insecticides, and this has a major bearing on which compounds can be used for control.

Insects were tested for resistance to four insecticides: Imidacloprid (a neonicotinoid), cypermethrin (a pyrethroid), abamectin (an avermectin) and pyriproxyfen (an insect growth regulator). The first three were tested using an adult leaf-dip bioassay, and pyriproxyfen was tested by treating eggs and monitoring egg hatch.

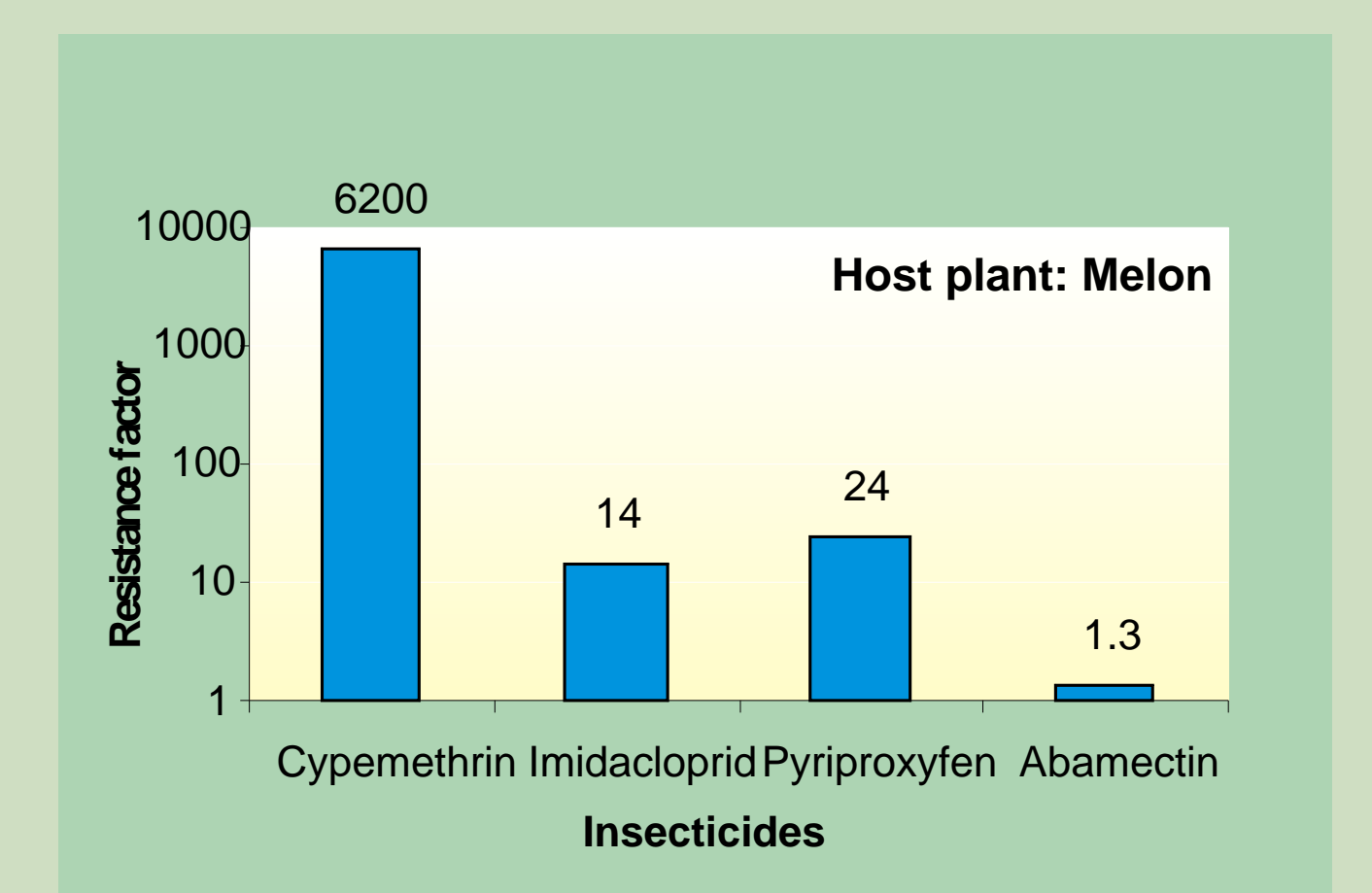
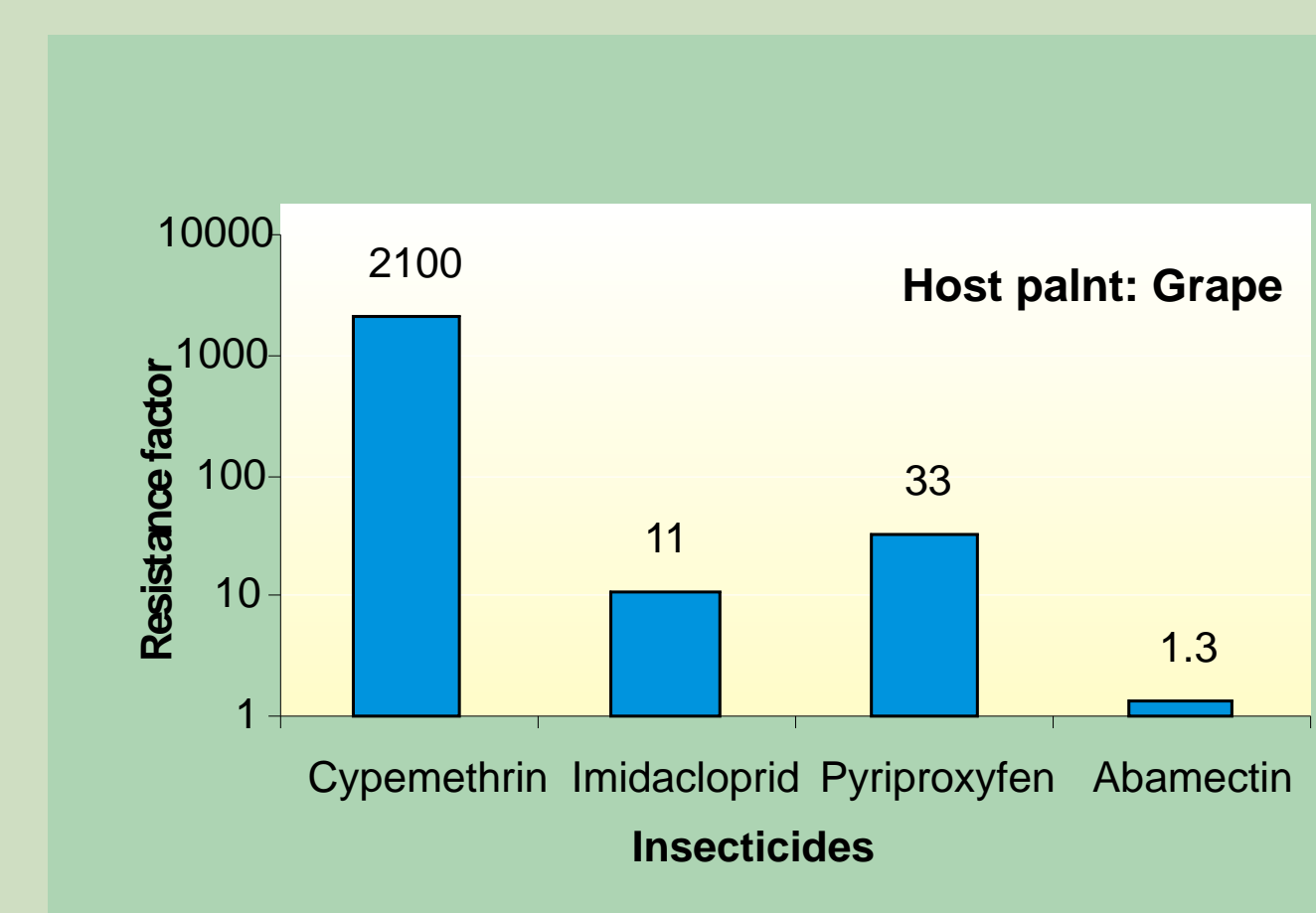
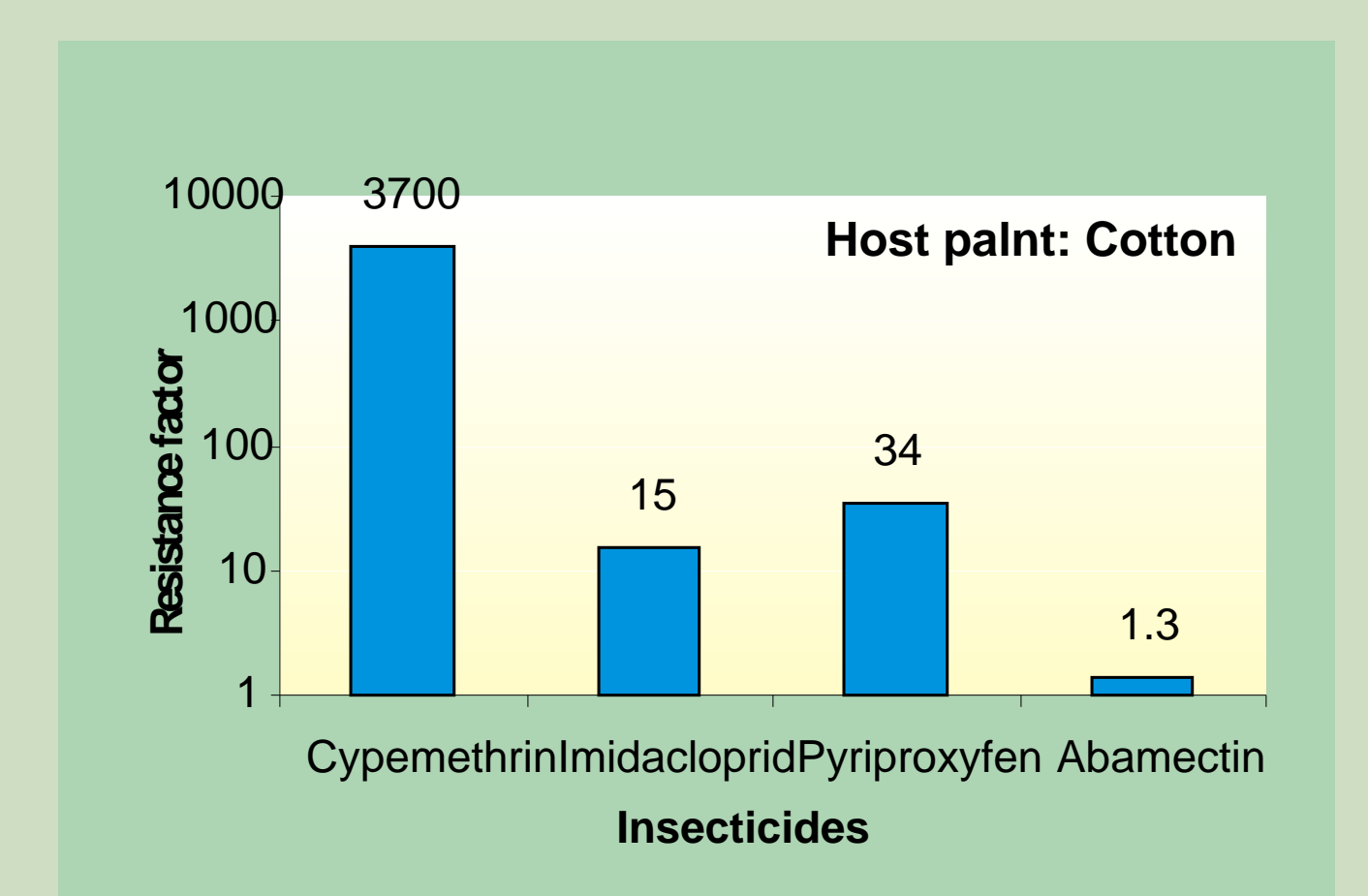
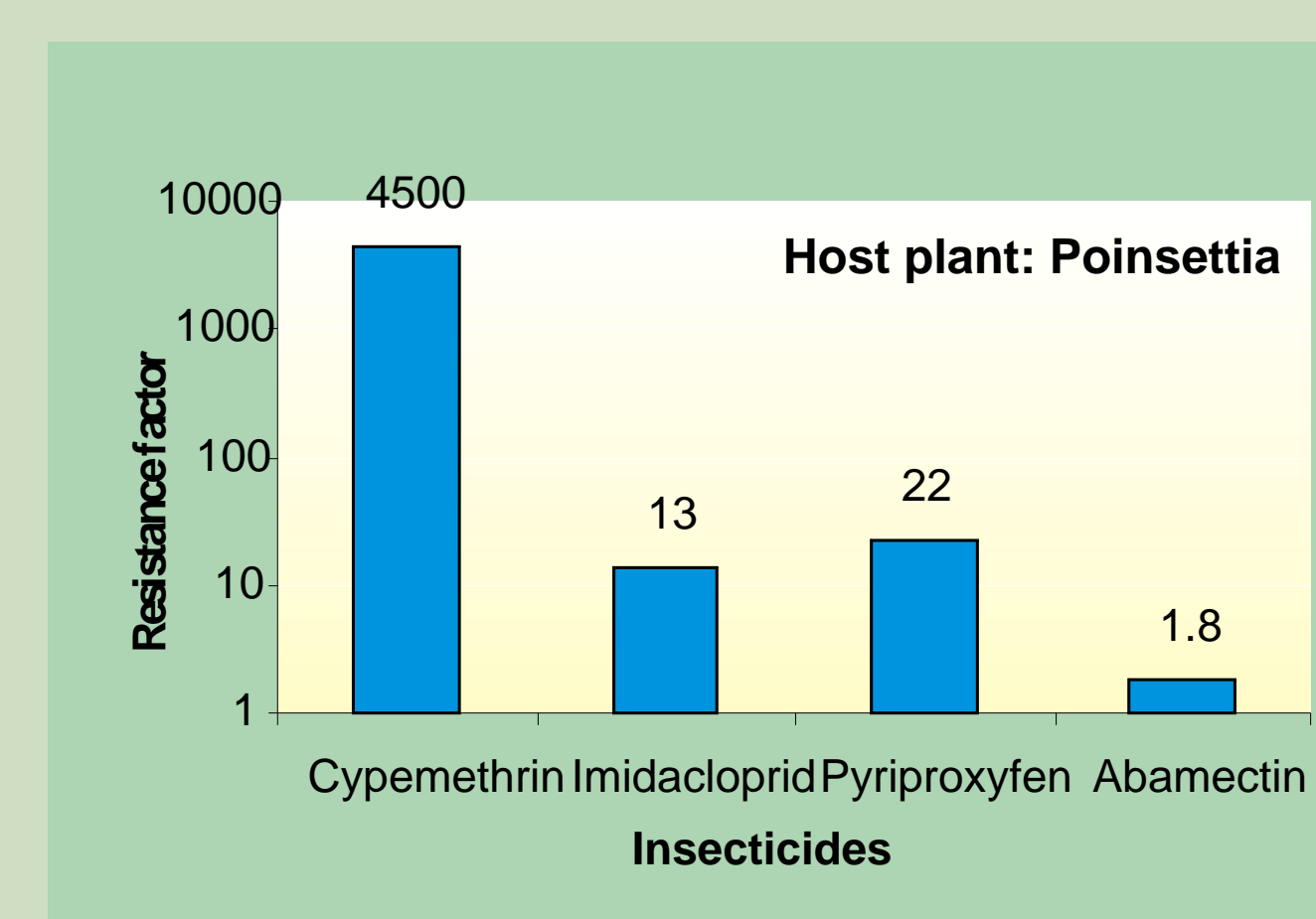


Adult leaf-dip bioassay



Ovicidal leaf-dip bioassay

In comparison with a susceptible strain, whiteflies from Xinjiang were all highly resistant to pyrethroids. Resistance factors for imidacloprid and pyriproxyfen were much smaller, and all strains were fully susceptible to abamectin. The strains examined have shown a very similar pattern of responses across compounds, regardless of the host plant they were collected from.



Resistance factors for Xinjiang strains collected from different crops

Conclusions

- Pyrethroids appear to offer little prospect for controlling *B. tabaci* in Xinjiang. However, newer compounds such as neonicotinoids, pyriproxyfen and abamectin are still little affected by resistance and can be incorporated into resistance management strategies.
- In light of this, the biggest threat of all is an invasion of Q-type whiteflies, which have already developed very strong resistance to compounds that show greatest promise for managing *B. tabaci* in Xinjiang.