THE LEPTON™ TEST KIT (PAT. PENDING) – THE HELIOTHIS ID PROJECT COMES TO FRUITION

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At the 1992 Australian Cotton Research Conference, we reported on field trials of a prototype Heliothis ID kit that were held during the 1991/92 growing season (Trowell *et al.*, 1992). We described a number of problems revealed by the field trials and outlined the research and development plan we had put in place to overcome them. All those problems were overcome by October 1992 and our second prototype performed very well in trials held during the 1992/93 growing season. Subsequently, the kit was licensed to Abbott Australasia Pty. Ltd. who christened it the LepTon™ Test Kit. As is probably well known throughout the cotton growing community, the LepTon™ Test Kit was launched by Abbott Australasia in October 1993 and has now been commercially available for one full cotton growing season. It plays an important role in the Australian cotton industry's resistance management strategy.

The LepTon™ Test is manufactured in Australia. Royalties from its sales are shared by CSIRO and the CRDC and are ploughed back into supporting research.

OVERCOMING FIELD PROBLEMS

Our 1991/92 prototype kit suffered from a number of interference problems under field conditions. The most intractable of these proved to be interference from endogenous larval enzymes. An additional serious problem was the great uncertainty experienced by users when scoring the results of the prototype test.

We chose not to compromise on our original aims by delivering a kit solely for use on eggs. Instead we embarked on a major redesign of the internal workings of the kit (whilst leaving the format unchanged) for the 1992/93 prototype

SUCCESS OF THE 1992/93 PROTOTYPE

Many growers and consultants will have seen a selection of the 1992/93 field trial data obtained by Neil Forrester's group. Here we present a table comparing the results obtained on eggs with the kit, with those obtained using the conventional rearing method.

Field Testing of the 1992/93 Prototype Heliothis ID Kit with Field Collected Eggs off Cotton. Namoi/Gwydir Area Jan-Feb 1993

Collection site	Collection date	% *H. armigera* reared from field collected eggs (no. of larvae reared)		% *H. armigera* as indicated by the kit (no. of eggs tested)	
Abbey Green	8 Jan	33	(156)	28	(100)
Carsons	8 Jan	40	(187)	43	(100)
Courallie	14 Jan	21	(310)	20	(100)
Yuma	14 Jan	32	(429)	41	(100)
Carsons	15 Jan	52	(273)	61	(100)
Carrington	20 Jan	11	(410)	9	(100)
Courallie	20 Jan	44	(465)	60	(100)
Fairford	20 Jan	36	(424)	39	(100)
Yuma	20 Jan	88	(532)	95	(100)
Yarral	22 Jan	89	(363)	86	(100)
Merinda	25 Jan	34*	(379)	91*	(100)
Glen Arvon	25 Jan	10	(324)	14	(100)
Havana	27 Jan	21	(381)	23	(100)
Yosemite	29 Jan	15	(337)	18	(100)
Carsons	29 Jan	20	(404)	18	(100)
Telleragah	29 Jan	3	(240)	4	(100)
Chesney	29 Jan	14	(470)	14	(100)
The Gardens	3 Feb	10	(231)	5	(100)
Carsons	8 Feb	78	(455)	70	(100)
Lochelgin	8 Feb	95	(371)	98	(100)

Overall the kit proved as accurate as achievable within the limitations of sampling error. The one outlier (*) serves as a warning that sampling and human factors remain a possible limitation for the application of any technology.

Additionally, testing of larvae obtained from the field under summer conditions indicated a false positive rate of less than 5% and a false negative rate of less than 2%. Whilst these error rates are greater than with eggs we believe they are acceptable from all points of view.

VALIDATION AND USE OF THE PRODUCTION LEPTON™ KIT

During the winter of 1993, Abbott Australasia, with assistance from NSW Agriculture and volunteer users, performed additional extensive validation work on production samples of the LepTon™ Test Kit. All was therefore ready for introduction of the Test in the 1993/94 commercial growing season.

This new technology has been widely used and has already had a significant impact on pest management in the Australian cotton industry. This is likely to increase in the future. Discussion of the practical issues involved is beyond the scope of this paper but interested readers are referred to articles on use and interpretation of the Kit (Forrester, 1993) and its implications for the insecticide resistance strategy (Forrester *et al.*, 1993).

FOR THE FUTURE

Major developments of the LepTon™ Test Kit are probably at an end. However Abbott Australasia, with the cooperation of the CSIRO, has an ongoing program to improve the sensitivity and ease of use of the kit. We would therefore hope to see some further incremental improvements in these areas. A detailed account of the

research leading to the LepTon™ Test Kit is planned for The Journal of Economic Entomology.

ACKNOWLEDGMENTS AND LESSONS FROM THE PROJECT

We believe the successful commercial uptake of the kit is a very positive outcome. One of the critical success factors can be identified as the willingness of many individuals across several organisations to cooperate wholeheartedly to make the project a success. These include not only the CSIRO and NSW Agriculture but also Abbott Australasia Pty Ltd and the many cotton growers and consultants who donated their time to testing or commenting on prototypes of the kit. Another critical factor was the willingness of the CRDC to provide continuity of funding for the project, particularly when many technical hurdles remained to be overcome.

REFERENCES

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