



GLOBAL FRUIT PROTECTION PTY LTD

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“Separating the Quality”

*Introducing.....*

The ClipSlip

## ***Introducing... The ClipSlip***

The ClipSlip is a unique plastic clip attached to a slipsheet and fitted onto growing fruit at the bagging stage. The product can be configured to fit either as a flat sheet or as a sleeve.

Because of its unique design, **the ClipSlip has no need for further placement once fitted onto the fruit**, thus dispensing with the current process whereby growers having to manually bag growing fruit, then use further labour resources to return two weeks later and fit the slipsheets.

The ClipSlip offers a raft of high value benefits to its users.

- The ClipSlip separates and protects growing fruit and prevents damage that frequently occurs after harvesting.
- Use of the ClipSlip can reduce fruit wastage to 1-3% with a corresponding increase in yield and profit.
- Through encouraging faster growth of fruit, the ClipSlip can increase plantation turnover by up to two weeks.
- Because the use of the ClipSlip dispenses with the need for labour to fit slip sheets, overall production costs are reduced.
- The reduction in organic waste due to the ClipSlip also reduces total labour usage costs.
- The ClipSlip is totally flexible, able to accommodate the differing configurations and sizes of individual varieties of bananas and a broad range of other fruits.
- The ClipSlip is very competitively priced and can be re-used up to ten times – offering up to six years' return on investment on each clip.
- The ClipSlip's ability to reduce waste recedes soil and water degradation and toxicity, the ClipSlip makes it possible to use less land and water for crop propagation and; fewer pesticides.
- Unlike many of the plastics used in banana production, the ClipSlip is not impregnated with chemicals.

***But don't just take our word for it!*** In independent scientific tests, sponsored by the Queensland Government:

Compared to traditionally grown bananas, the fruit grown with ClipSlips applied had:

- 25 times less tip scarring (old and fresh)
- 34% less bag rub
- 30% less fresh handling damage
- 23% less fresh knife cuts
- 53% less animal damage
- 11 times less field sap staining

**In total, the fruit grown with ClipSlips had 44% less wastage than that grown traditionally** – 89.9 kilos of total fruit wastage, compared to 161.4 kilos.



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“Separating the Quality”

# Field Trial Summary

**THE CLIPSLIP -  
FIELD TRIAL SUMMARY REPORT**

GLOBAL FRUIT PROTECTION PTY LTD

# **The ClipSlip**

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This report is based on “*Banana ClipSlip Trial at Murray Upper, 2006*”, compiled by C. Lemin, Queensland Department of Primary Industries and Fisheries, South Johnstone and R. Piper, Scientific Advisory Services Pty Ltd, Tully. Copies of the original report are available upon request, from Global Fruit Protection Pty Ltd

## Executive Summary

**D**esigned initially to protect bananas pre and post harvesting, the ClipSlip consists of a plastic slipsheet, attached to a clip and fitted onto growing fruit at the bagging stage. Because of its unique design, the ClipSlip has no need for further placement once fitted onto the fruit, thus dispensing with the current process whereby growers having to manually bag growing fruit, then use further labour resources to return two weeks later and fit the slipsheets.

The ClipSlip was awarded an Innovation Start Up Scheme grant by the Queensland State Government in 2006, to support its commercialisation. Part of that grant was used to finance independent field tests and the subsequent independent trial report upon which this paper is based. In the trial, 46 banana bunches were grown and compared under commercial conditions, with ClipSlips applied to 23; and 23 grown in the traditional way. In reviewing this report, it should be noted that the trial was conducted at a time when bunch development conditions (temperature and humidity) were optimal. The researchers reported that tip scarring is generally worse under non-optimal growing conditions. According there could be an even more significant difference between the two groups if the trial had been performed during a non-optimal time of year.

This report presents an overview of the trial and summarises its findings. Readers are asked to note that copies of the full report are available upon request from Global Fruit Protection, PO Box 946, Tully, Queensland, 4854, Australia

## THE CLIPSLIP - FIELD TRIAL SUMMARY REPORT

The independently validated field trials of the ClipSlip, performed at Murray Upper and reported upon in Decembr 2006 found that:

Compared to traditionally grown bananas, the fruit grown with ClipSlips applied had:

- 25 times less tip scarring (old and fresh)
- 34% less bag rub
- 30% less fresh handling damage
- 23% less fresh knife cuts
- 53% less animal damage
- 11 times less field sap staining

In total, the fruit grown with ClipSlips had 44% less wastage than that grown traditionally – 89.9 kilos of total fruit wastage, compared to 161.4 kilos.

The following summary table details the reason for rejection of fruit grown during the trial, the weight of fruit rejected in each category; and the percentage of total fruit it represents:

	WITH ClipSlip	NO ClipSlip	WITH ClipSlip	NO ClipSlip
REASON FOR REJECTION	FRUIT (KG)	FRUIT (KG)	FRUIT %	FRUIT %
Old Tip Scarring	1.3	33.3	0.2	4.6
Fresh Tip Scarring	0.3	5.5	0.0	0.8
Fresh Handling Damage	12.7	18.1	1.9	2.5
Animal Damage	20.3	37.8	3.0	5.2
Field Sap Stain	0.2	2.3	0.0	0.3
Bag Rub	3.7	11.0	0.5	1.5
Fresh Knife Cuts	3.5	4.5	0.5	0.6
Pruning Cuts	0.2	0.3	0.0	0.0
Rots and Sunburn	20.1	20.5	2.9	2.8
Dry Scars	18.2	16.1	2.7	2.2
Doubles and WIngs	6.9	10.0	1	1.4
No apparent reson for rejection	2.5	2.1	0.4	0.3
<b>TOTAL REJECT FRUIT</b>	<b>89.9</b>	<b>161.4</b>	<b>13.1</b>	<b>22.1</b>

## The Trial

### 2.1 Method

**D**uring routine bunch covering operations on a commercial banana farm at Murray Upper in Far North Queensland, Australia, ClipSlips were fitted on to alternate banana bunches, with every second bunch left as normal. Bunches were marked with pink tape and tagged with the number of the week when the bell was injected. Bagging was performed two weeks after bell injection.

There was only one difference between the two treatments – that being the placement or not of ClipSlips. The trial was performed on Cavendish bananas variety Williams and the plantation was a first ratoon block.

Bunches were harvested during the morning of Wednesday 6 December 2006; and consisted of bunches which had been bell injected during the period of 1 August 2006 – 1 September 2006 (tagged as weeks 31-35). Bunches for the trial were harvested from the same paddock and normal practice of harvest and transport was performed. Bunches from each treatment were placed on separate sides of the bunch trailer, which allowed separate batching of the treatments through the packing shed.

The trial consisted of:

- A close study of the position and type of damage to the fruit
  - A study of packout and reject fruit and
  - Two timing studies, one relating to de-handing, pack and sorting: the other looking at bagging and placement of ClipSlips into bunches.
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## **2.2 Part A – Fruit Quality Assessment**

Following bunch washing, 8 bunches were randomly selected for each of the treatments. Prior to sorting and packing; and after de-handing, the top, middle and bottom hands of each bunch were marked with fluorescent tape and their position in each bunch and bunch number recorded on the tape.

After de-sapping in the water trough, each hand was examined finger by finger and the position of any damage present was recorded. The fruit from this assessment formed no further part in the trial.

The number of hands on each of the trial bunches varied from 7 to 10 for the 16 bunches selected for finger assessments. Severity of damage was recorded, but the data was not analysed as similar levels were recorded from both treatments and generally categorised as being “low”.

### **2.2.1 Findings**

The researchers found that damage caused by tip scarring both prior to harvest and following was reduced by placing ClipSlips in bunches at bagging. Bag rub, tresh tip scarring and fresh handling damage were also reduced by the application of ClipSlips.

Wastage of fruit was reduced as a result of the ClipSlip and the researchers also reported that the use of ClipSlips has positive results on reduction in fruit losses due to fruit damage both prior to and following harvest.

## **2.3 Part B – Packout and Reject Assessment**

At the packing shed, after completion of the fruit quality assessment above, 23 bunches each of fruit grown with and without ClipSlips were selected. For each treatment, the 8 bunches used in the fruit quality assessment were included.

Both series of bunches were processed through the packing shed separately, under normal shed procedures (i.e. as if the market was well supplied). The yeild from the bunches was recorded and reject fruit set aside. All rejected fruit was collected, classified according to the major type of damage causing its rejection. Each category of reject fruit was then weighed.

It was therefore possible to compare the yeilds both by weight and quality between the two treatments, as well as comparing reject ratios and the principal types and relative levels of damage leading to fruit rejection.

### **2.3.1 Findings**

The packout and reject assessment found that compared to traditionally grown bunches, the fruit grown with ClipSlips had:

- 25 times less tip scarring (old and fresh)
- 34% less bag rub
- 30% less fresh handling damage
- 23% less fresh knife cuts
- 53% less animal damage
- 11 times less field sap staining

In total, the bunches grown with ClipSlips had 89.9 kilos of rejected fruit (13.1% of total ClipSlip grown fruit in the trial), while the bunches grown traditionally had 161.4 kilos rejected (22.1 of total traditionally grown fruit in the trial).

The researchers found that the results favoured the use of the ClipSlip when examining the categories of waste that the ClipSlip could be expected to reduce such as dry tip scarring, bag rub, fresh tip scarring and fresh handling damage.

The researchers felt it unfortunate there was considerable animal damage in the trial as it may have masked some of the effects of the ClipSlip treatment.

## THE CLIPSLIP - FIELD TRIAL SUMMARY REPORT

Tip scarring caused prior to harvest was thirty times greater in bunches with no ClipSlips than in bunches with ClipSlips; and reject fruit due to dry tip scarring constituted 4.6% of total fruit weight in bunches without ClipSlips compared to just 0.2% in those with ClipSlip treatment.

The researchers found:

***“This result confirms the hypothesis that the ClipSlip reduces the scarring during fruit development caused by old flower parts and finger tip rubbing on the adjacent fruit”***

There was three times as much reject fruit due to bag rub in the bunches without ClipSlips as there was in the bunches with ClipSlips. The researchers found “it would appear that the plastic protruding past the finger tips prevents the bag from contacting the fruit to cause the rubbing damage when windy conditions push the bag against the fruit”.

There was eighteen times as much fresh tip scarring in bunches where no ClipSlip had been applied compared with ClipSlips.

The researchers reported that “the percentage of total fruit harvested that was rejected with fresh tip scarring was negligible (almost 0%) where ClipSlips were applied, compared to 0.8% when no ClipSlips were used”.

Damage that occurred from the time of harvest until the fruit was placed into waste bins was considerably reduced where ClipSlips had been used (1.9% of total fruit harvested) compared with the control bunches (2.5% of total fruit harvested).

In their discussion of implications for farm productivity, the researchers noted:

***“The ClipSlip was primarily developed to reduce old tip scarring as it prevents the pointed ends of fruit and flower structures rubbing against the skin of fingers in the hand above.***

***The result from this trial would suggest that this invention has significantly increased marketable fruit through prevention and/or reduction of this type of damage”.***

## **2.4 Part C – Shed Productivity Assessment**

Both series of bunches were sorted/graded and packed by the same five people. The sorting/grading and packing operations took a total 3.7 person hours for the treatment with no ClipSlips; and 2.7 person-hours for the ClipSlip treatment. It therefore took 37% extra time to process the fruit from bunches with no ClipSlips fitted.

However, as there was more fruit in the control treatment, a crude productivity analysis was undertaken. This analysis gave the following result:

	<b>SORTED, GRADED AND PACKED FRUIT</b>
With ClipSlip	255 kg/person-hour
Without ClipSlip	200 kg/person-hour

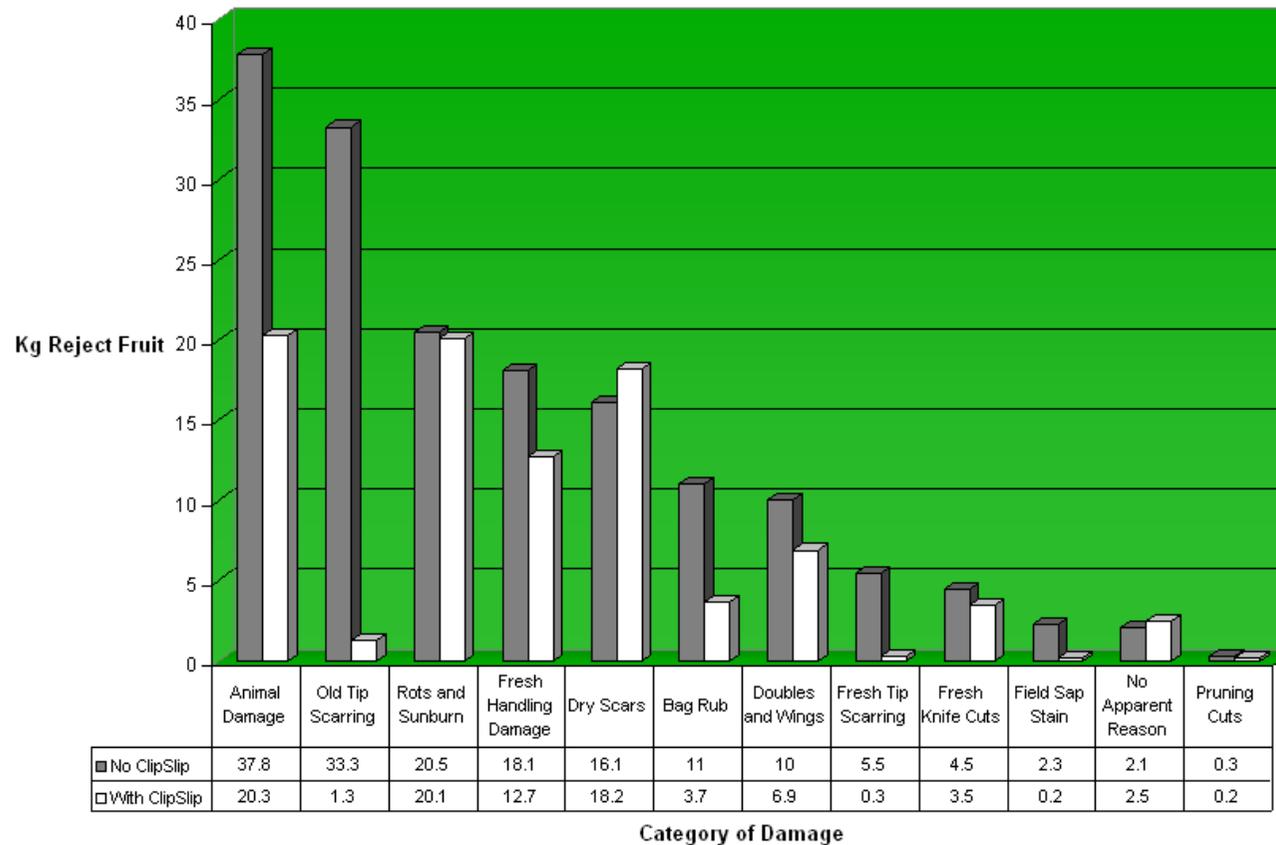
The researchers concluded that:

***“On this measure the ClipSlips resulted in a 28% productivity improvement over the control treatment”.***

**THE CLIPSLIP -  
FIELD TRIAL SUMMARY REPORT**

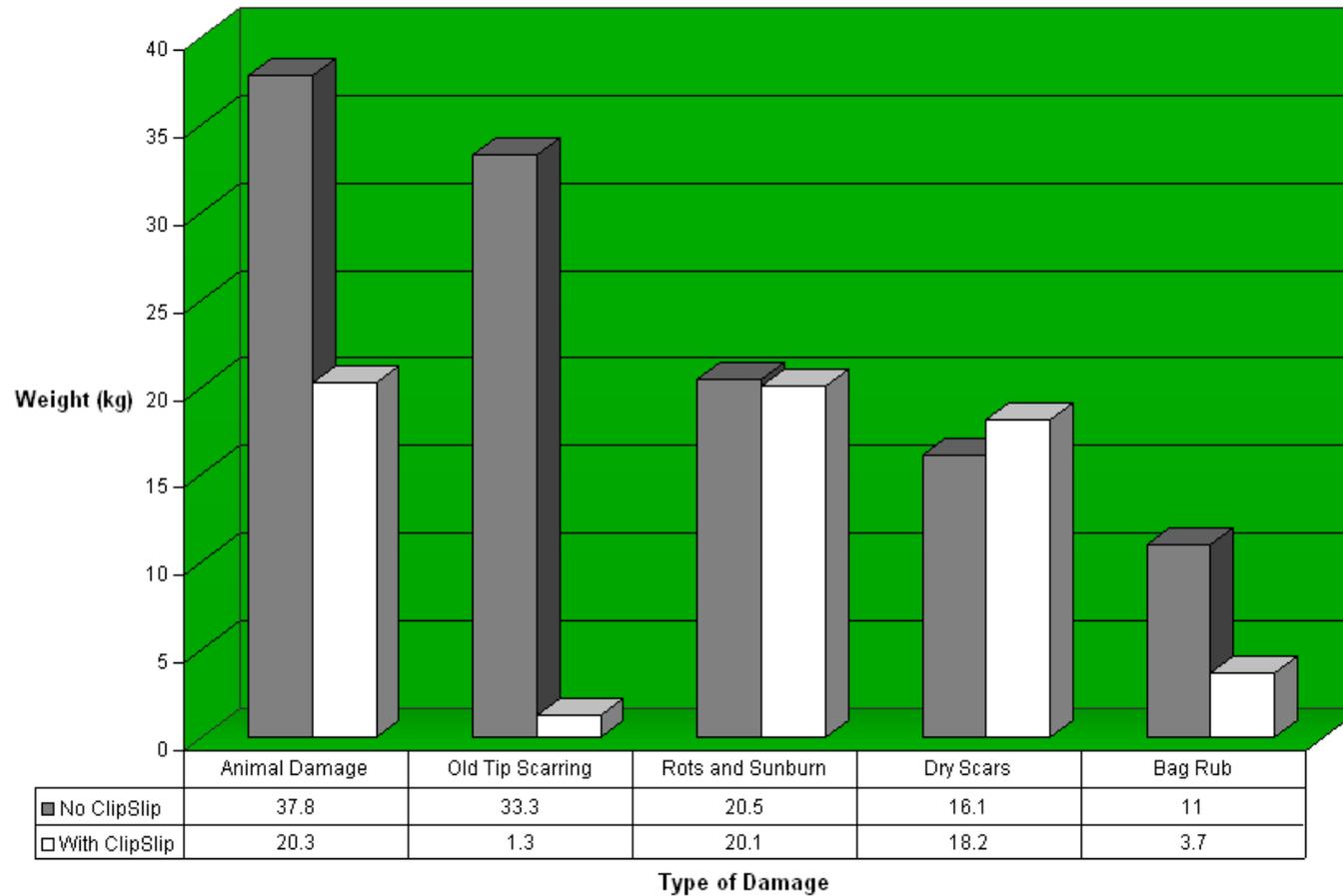
**RESULTS OF INDEPENDENTLY VALIDATED FIELD TESTS ON THE CLIPSLIP DECEMBER 2006**

**Reject Fruit by Category**



**THE CLIPSLIP -  
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**Field Damage by Category**



**THE CLIPSLIP -  
FIELD TRIAL SUMMARY REPORT**

**Harvesting and Handling Damage**

