

**PROSPECTS FOR THE
MANAGEMENT OF COCOA
MIRIDS WITH MIRID SEX
PHEROMONES**

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IMPORTANCE

- Cocoa is a major foreign exchange earner for West African countries especially Ghana where until recently it was the leading foreign exchange earner.
- It is estimated that about six million Ghanaians earn their livelihood from cocoa

INSECT PEST PROBLEMS

- Cocoa mirids, *Sahlbergella singularis* and *Distantiella theobroma* are the most important major insect pests in Ghana.
- They do similar damage to cocoa which results in about 25 – 30% reduction in yield.

COCOA MIRIDS



MIRID DAMAGE

- Mirid bugs cause lesions on pods
- Destroy immature pods
- Destroy growing point
- Destroy trees
- Promote fungal infection (*Calonectria* spp.)



MIRID DAMAGE



CONTROL OF MIRIDS

Mirids are controlled by the application of conventional insecticides only. Foliar application Four times/year---August-December monthly, November omitted

PROBLEMS WITH INSECTICIDE USE

- Toxicity
- Pollution of environment
- Residue
- High financial costs
- Preference of consumers for cocoa with little or no chemicals etc. etc.
- Therefore interest generated in development of safe non-chemical methods

CRIG's SHIFT IN PARIDIGM

- Funding from DFID between 1998 and 2005
- Collaboration between The Cocoa Research Institute of Ghana (CRIG), the Natural Resources Institute of U.K. (NRI) and CABI to develop a more sustainable, affordable and environmentally friendly Integrated Pest Management (IPM) programme, involving the use of female mirid sex pheromones (NRI) and fungal pathogens (CABI) to control the mirids

PHEROMONE COMPONENT OF IPM

Utilisation of synthetic analogues of sex pheromones from female mirids to trap the males. This is intended to eventually manage the mirid population with little or no chemicals thereby avoiding most of the problems associated with insecticide use to improve the management.

WHAT ARE PHEROMONES?

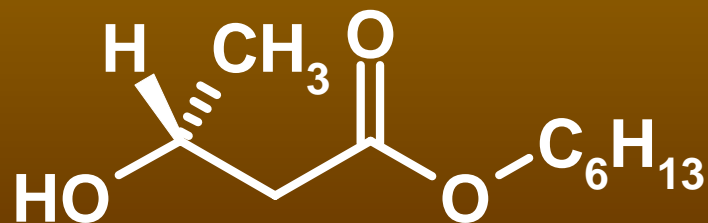
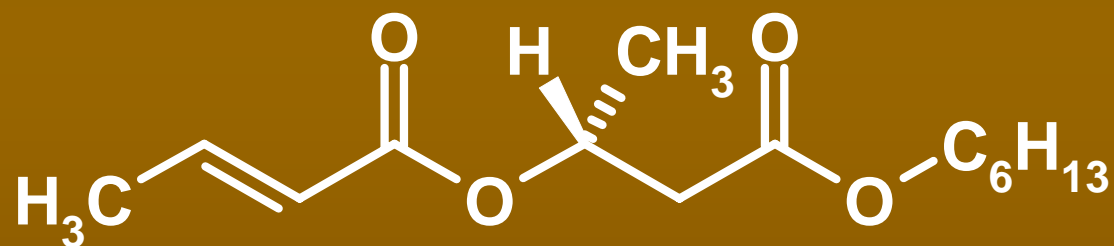
- Chemicals produced by animals eg. Insects, for communication
- Both sexes can produce them
- There are several types depending on function eg. Sex pheromones, aggregation pheromones, etc. etc.
- Potent agents for pest control
- Cheaper?

STRATEGY

- Monitoring
- Mass trapping
- Mating disruption

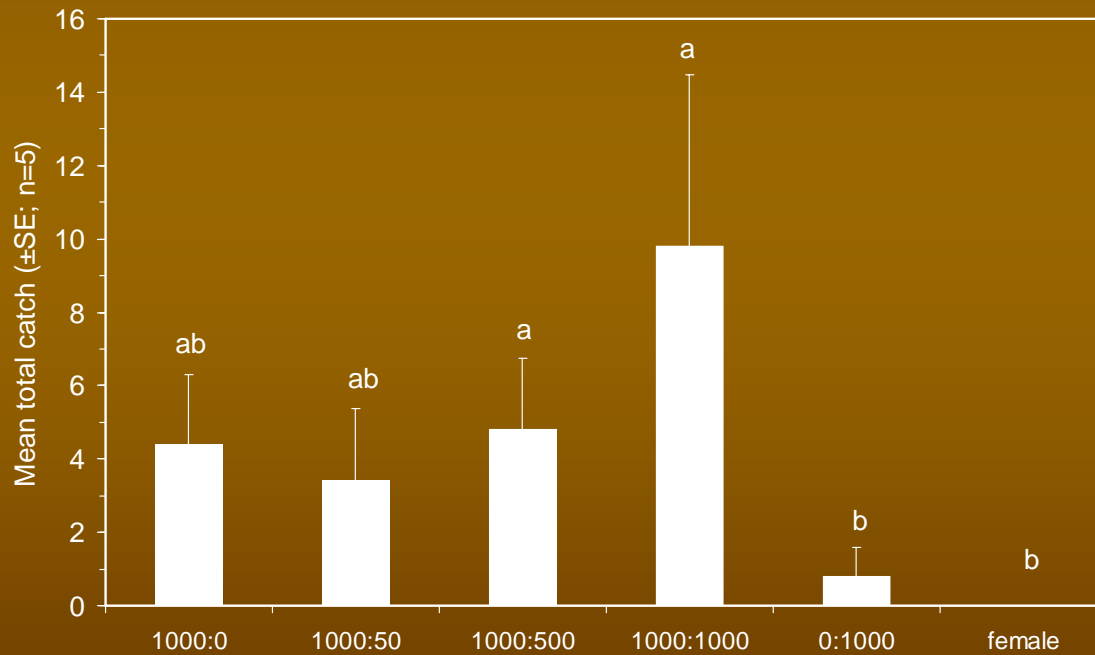
ACHIEVEMENTS

Novel pheromone components identified and synthesised for both species



ACHIEVEMENTS cont'd

Synthetic pheromone attracts males



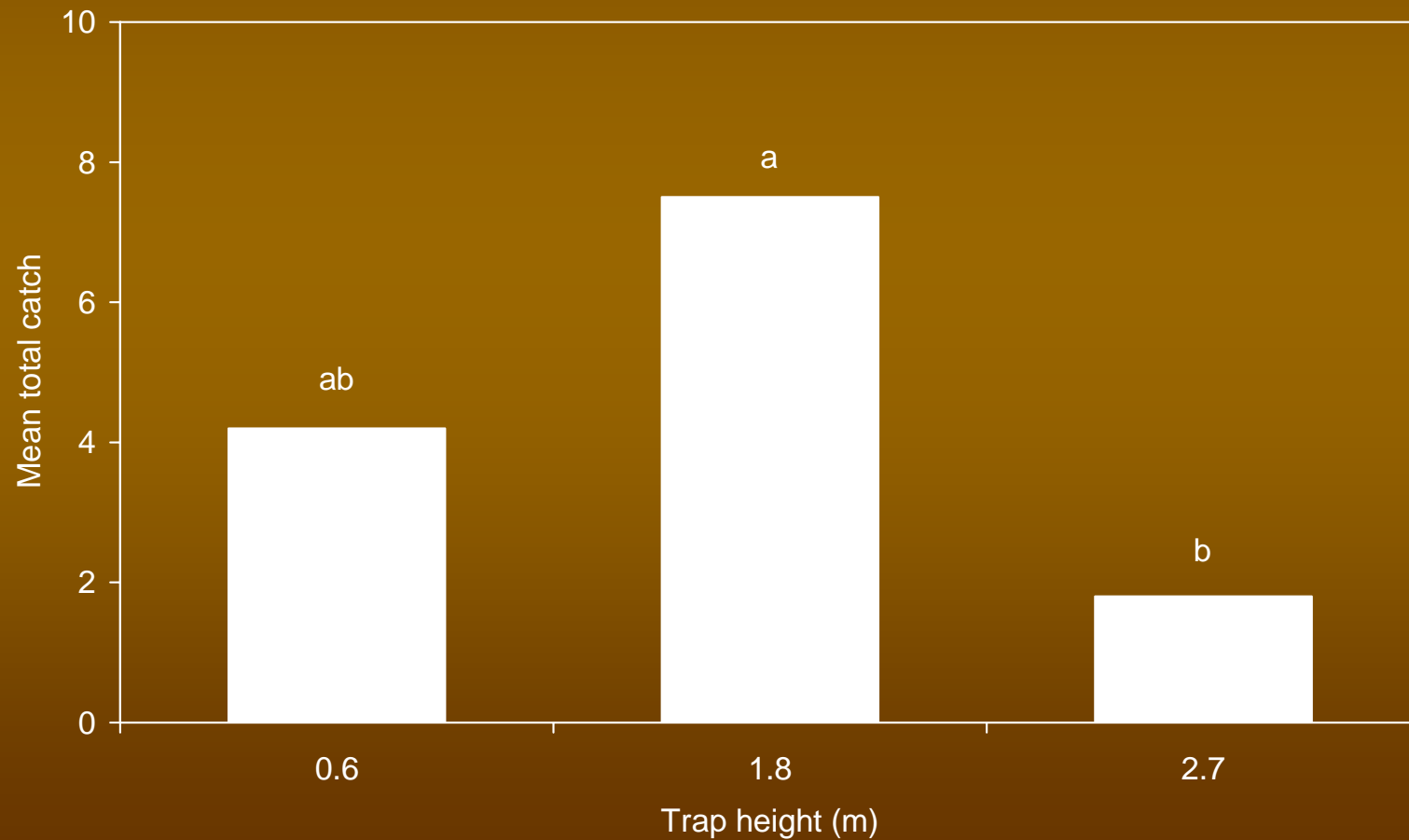
ACHIEVEMENTS cont'd

- Sticky traps found to be most appropriate for mirid trapping
- NRT designed by CRIG and NRI



ACHIEVEMENTS cont'd

Vertical placement of trap determined



ACHIEVEMENTS cont'd

Mass trapping demonstrated

Total numbers of male mirids caught per month in traps on different trap density plots

Month	5 traps/0.1ha		10traps/0.1ha		15 traps/0.1ha	
		()		()		()
April 2003 (2004)	1	(7)	14	(19)	9	(18)
May 2003 (2004)	1	(10)	1	(19)	3	(16)
June 2003 (2004)	0	(6)	0	(2)	0	(9)
July 2003 (2004)	0	(0)	0	(0)	2	(1)
August 2003 (2004)	1	(10)	4	(7)	1	(3)
September 2003 (2004)	1	(11)	2	(6)	12	(14)
October 2003 (2004)	14	(16)	21	(21)	36	(16)
November 2003 (2004)	30	(23)	40	(50)	72	(25)
December 2003 (2004)	32	(31)	50	(66)	81	(44)
January 2004 (2005)	59	(43)	79	(129)	65	(46)
February 2004 (2005)	34	(41)	61	(140)	38	(56)
March 2004 (2005)	47	(6)	119	(30)	67	(26)
Total	220	(204)	396	(479)	391	(274)

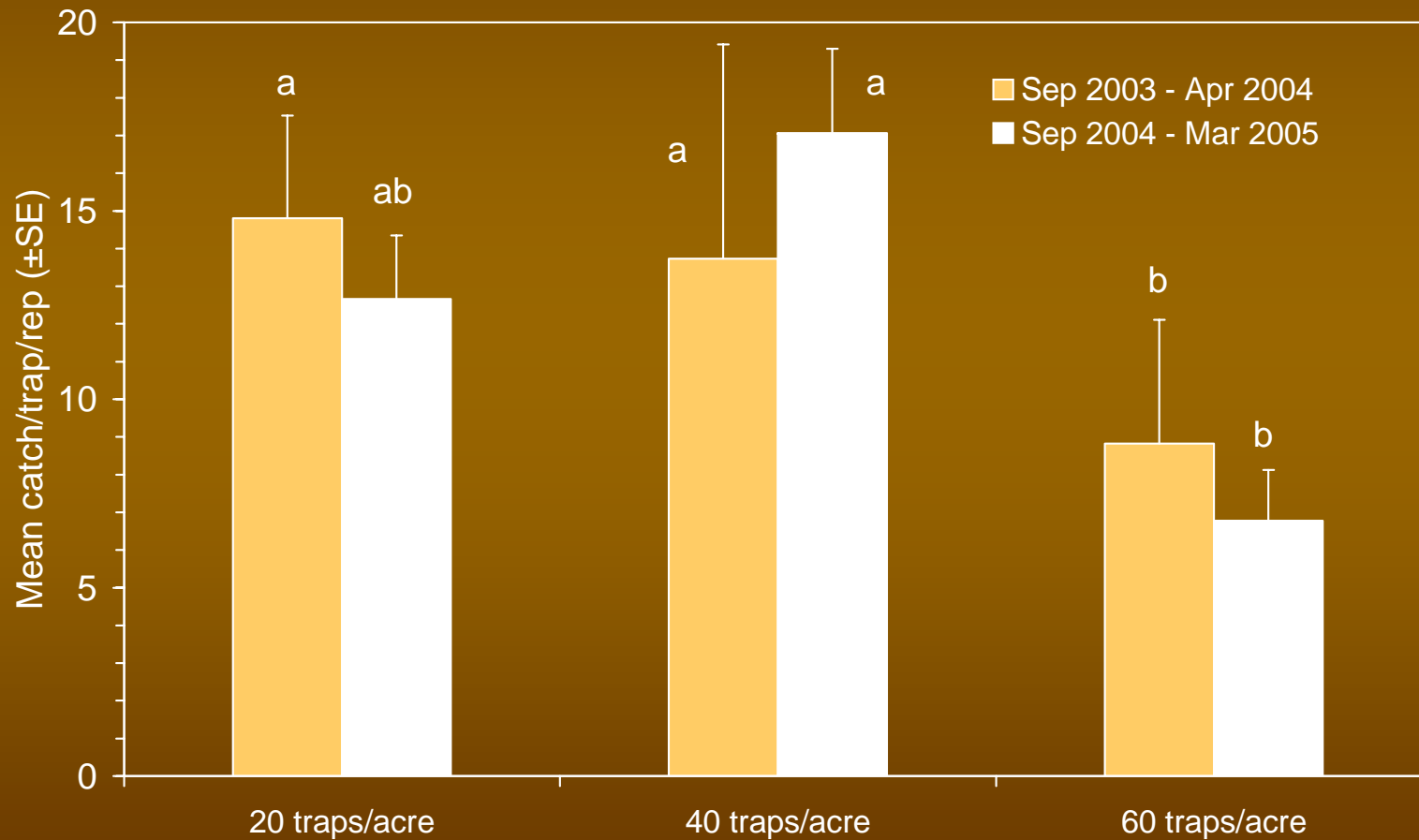
() Values for 2004/2005.

ACHIEVEMENTS cont'd

- Catches reflective of known seasonal incidence of mirids in Ghana
- Potential for monitoring

ACHIEVEMENTS cont'd

Catches reduced at higher density



Competition? Trapping out? Mating confusion?

FARMERS USING TRAPS



SAFE CONTROL OF MIRIDS ON COCOA IN WEST AFRICA - CRUK

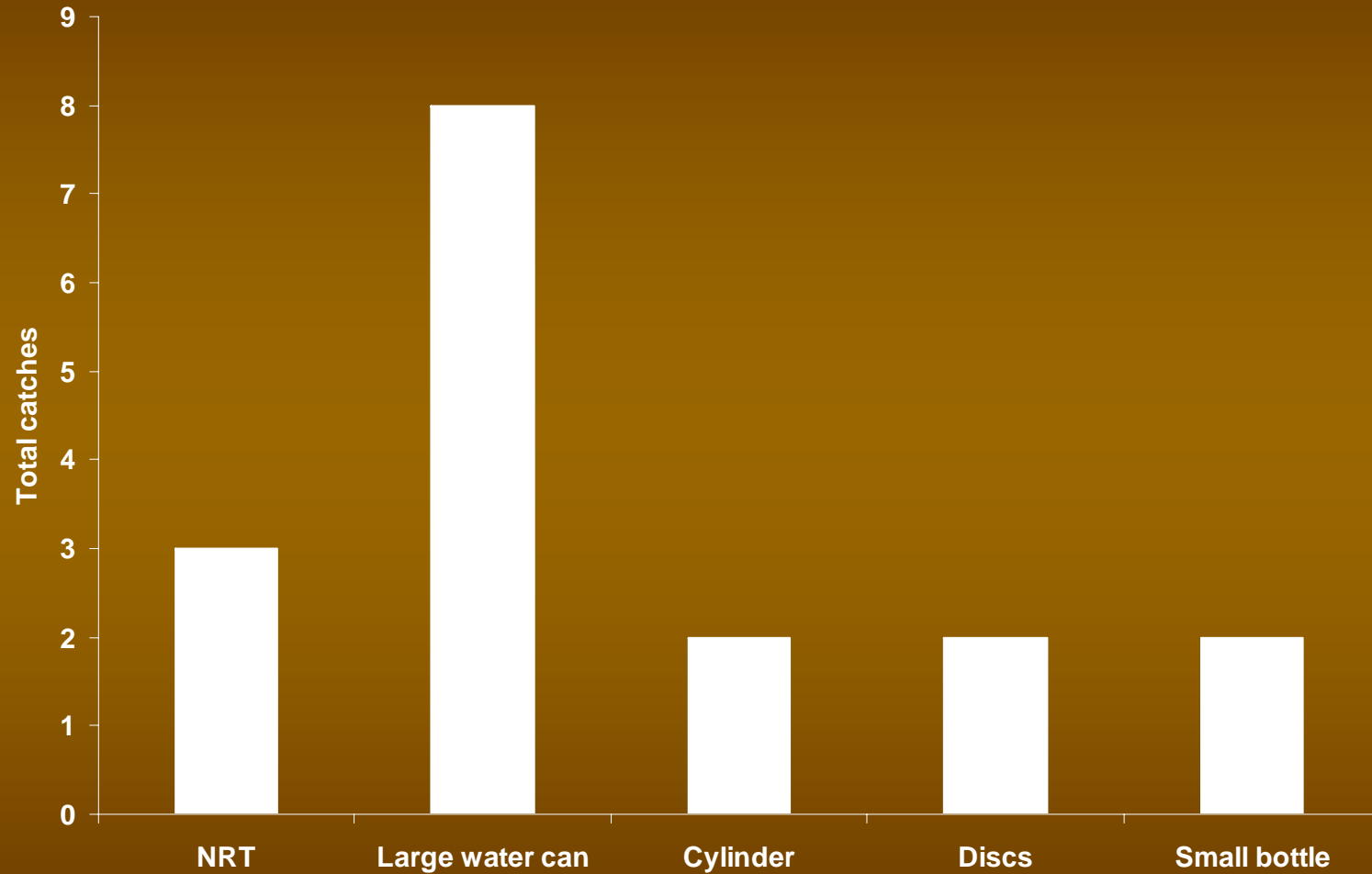
- Optimise pheromone blends, lure longevity, trap design and trap placement
- Develop pheromone traps for monitoring to reduce pesticide use in conventional mirid control
- Test whether control with pheromone is possible by one or more techniques of mass trapping, lure-and-kill, mating disruption, etc.



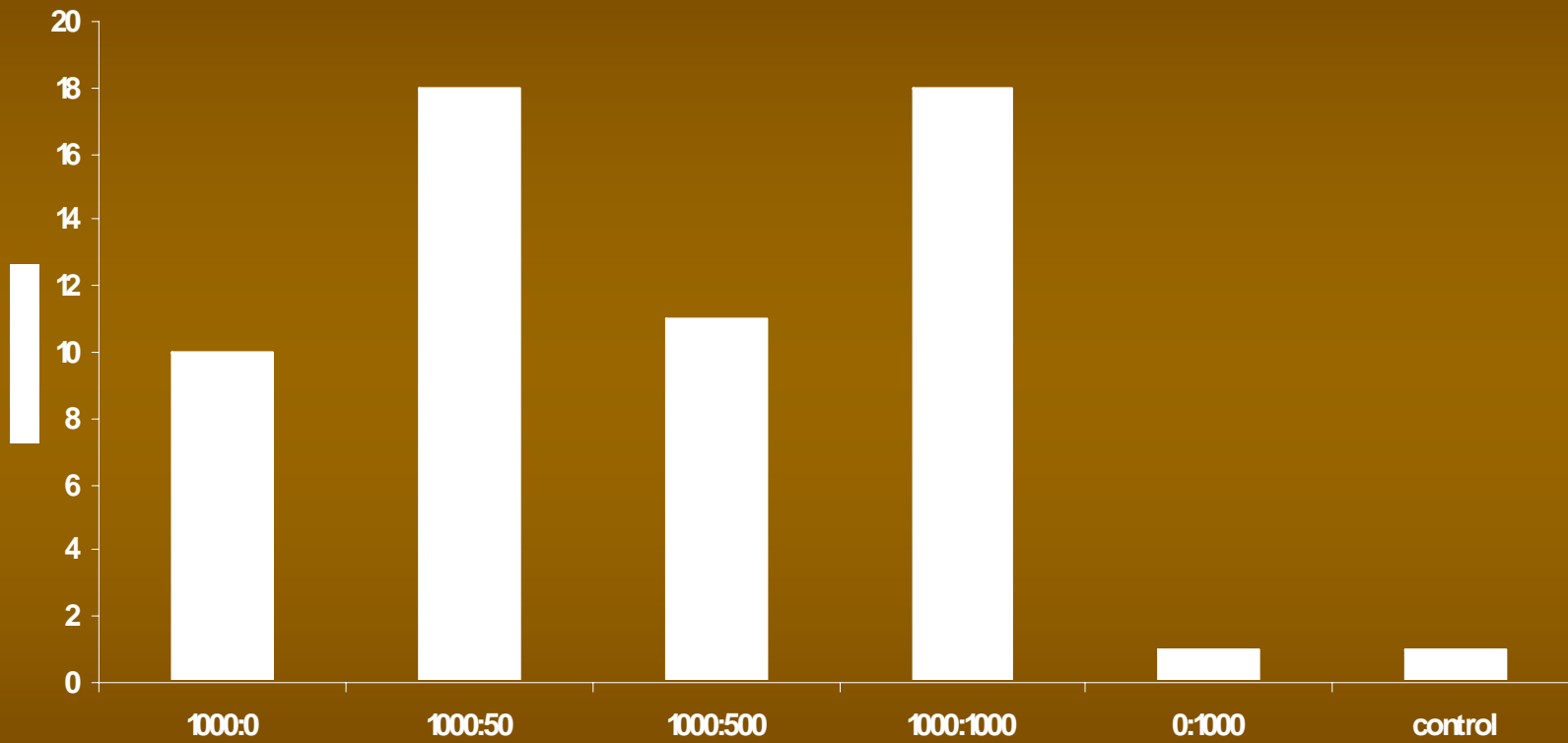
TRAP DESIGNS



Trap Design (Akwadum) - catches 27 March - 17 May



Blend experiment (Akwadum) - catches 29 March - 16 May



CONCLUSIONS

- Prospects for improving management of mirids through pheromone trapping are good.
- There is probability of its use as a monitoring tool and possibly in mass trapping and mating disruption either or all of which would lead to reduction in the application of chemical insecticides.
- Also, farmers are already enthused about the technology and there is goodwill among other stakeholders.