

**Field Trip**

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**International workshop on *Ceratocystis*  
in hardwood plantation**

**PT RAPP  
Riau, Indonesia**

**February 18, 2016**

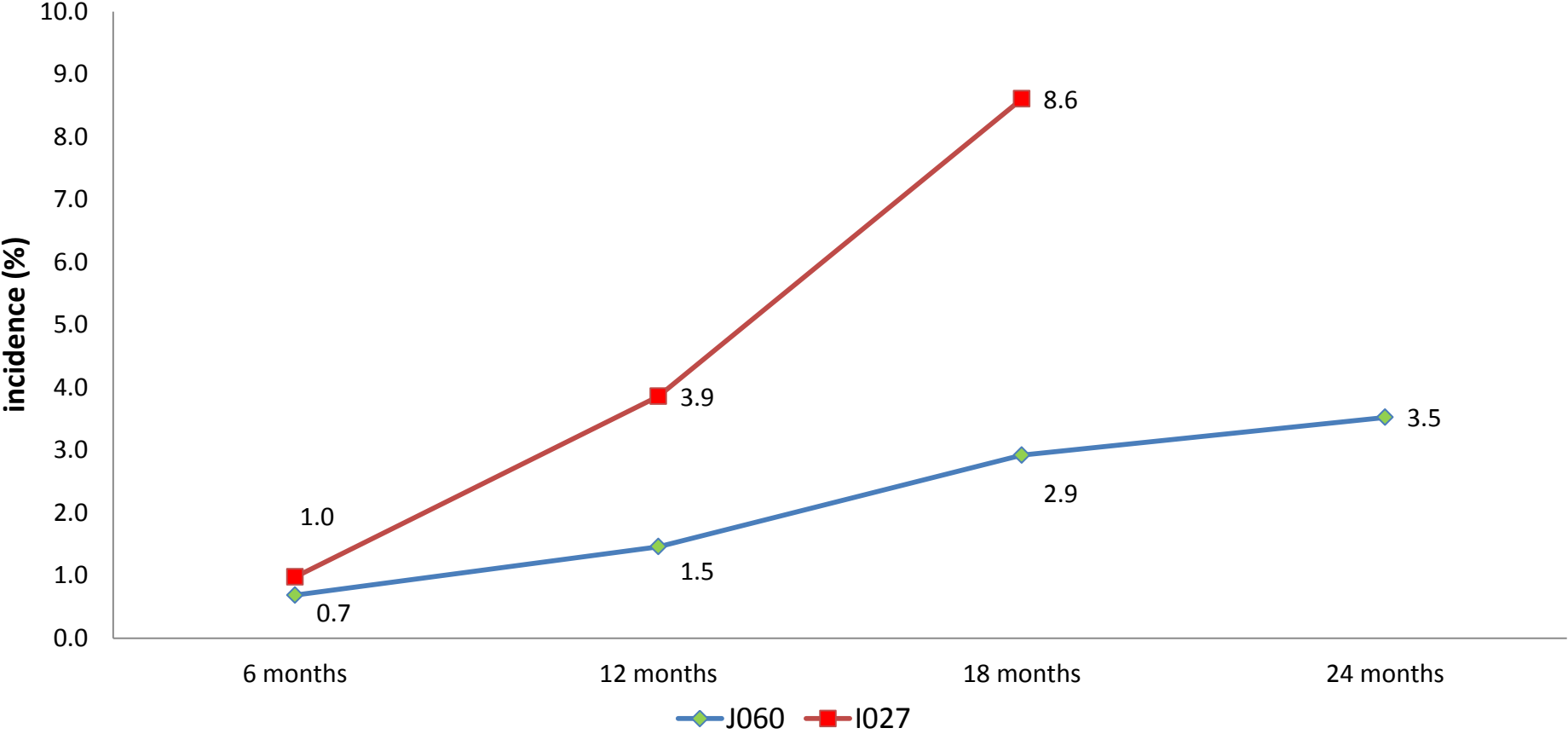
# Program

Date/Day	Time	Activity	Location
February 17 Wednesday	12:30	Arrival at the SSQ II Airport	Pekanbaru
	12:30-13:30	Lunch	Pekanbaru
	13:30-15:00	Travel to RAPP Complex	Pekanbaru
	15:00-16:00	Unigraha Hotel check in	Kerinci
	16:00-17:30	RGE Technology Center tour	Kerinci
	19:00	Dinner at Unigraha Hotel	Kerinci
	February 18 Thursday	06:00-07:00	Breakfast at Unigraha Hotel
07:00-10:30		Travel to trial sites in Baserah from Unigraha Hotel	Kerinci
10:30-12:00		Trial visit	Baserah
12:00-13:00		Lunch	Baserah
13:00-14:00		Travel to trial site in Teso	Baserah
14:00-15:00		Trial visit	Teso
15:00-17:30		Travel to Pekanbaru	Teso
17:30-18:00		Hotel check in	Pekanbaru
19:00		Dinner	Pekanbaru
February 19 Friday	AM/PM	Good bye everyone, you all have a safe and nice flight home!!!	Pekanbaru

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**Level of *Ceratocystis* natural infection  
in some *Acacia mangium*  
materials**

# Ceratocystis trends in AMFPD 103 (J060) and AMFPD 119 (I027) trials



## Site 1

**Trial Code : AMFPD119**

**Title** : Level of *Ceratocystis* natural infection in some *Acacia mangium* materials

**Objective** : To evaluate variation in tolerance/susceptibility in *A. mangium* materials to *Ceratocystis* natural infection

**Location** : I027 Baserah

**Area** : 7.5 ha

**Rotation** : 4

**Material** : 41 AM + 1 AH + 1 AC + 1 EH materials

**Established** : May 2014

**Duration** : 5 years

**Trial Design** : RCBD

**Replication** : 6

**Plot size** : 6 trees x 6 trees

**Spacing** : 3 m x 2 m (initial stocking 1667 trees per ha)

Road

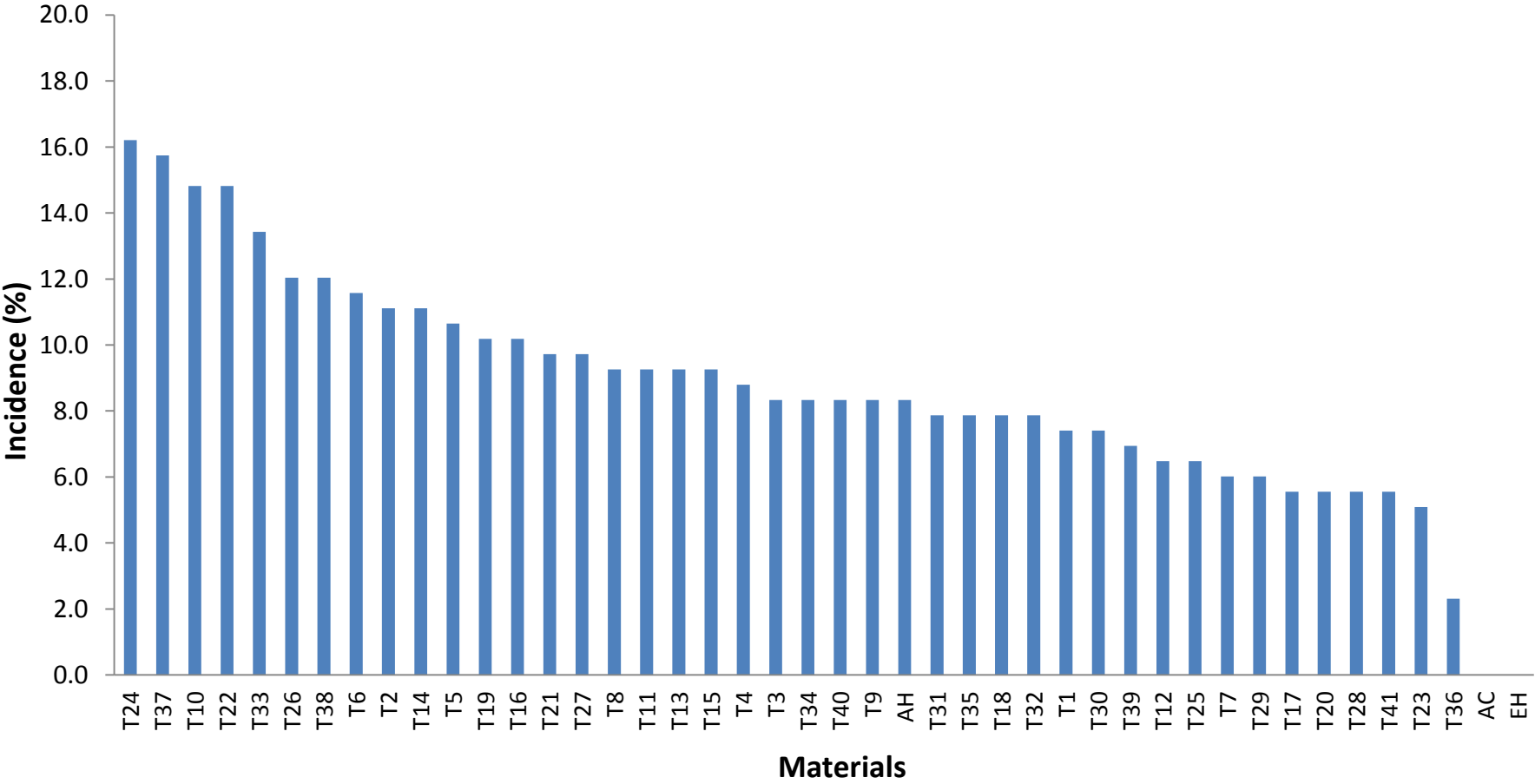
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x	T22R1	x	T44R1	T4R1	T41R1	T19R1	T37R1	T17R1	T12R1	T29R1	T36R1	T28R1	T13R1	T39R1	
T10R1	T26R1	T20R1	T21R1	T32R1	T43R1	T5R1	T9R1	T8R1	T1R1	T7R1	T16R1	T35R1	T40R1	T24R1	
T32R2	T37R2	T13R2	T33R2	T11R2	T44R2	T25R2	T16R2	T35R2	T8R2	T7R2	T34R2	T27R2	T24R2	T12R2	T22R2
T14R2	T10R2	T43R2	T31R2	T9R2	T19R2	T18R2	T39R2	T36R2	T21R2	T4R2	T26R2	T17R2	T2R2	T15R2	
	T3R2	T40R2	T42R2	T1R2	T5R2	x	T6R2	T20R2	T29R2	T28R2	T30R2	T41R2	T38R2	T23R2	
	T44R3	T27R3	T38R3	T23R3	T35R3	T5R3	T17R3	T6R3	T10R3	T7R3	T37R3	T32R3	T4R3	T20R3	T2R3
	T14R3	T30R3	T26R3	T34R3	T29R3	T15R3	T15R3	T42R3	T28R3	T43R3	T36R3	T33R3	T16R3	T41R3	T8R3
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	T20R4	T2R4	T1R4	T24R4	T28R4	T18R4	T30R4	T34R4	T35R4	T25R4	T10R4	T9R4	T5R4	T19R4	T40R4
	T26R4	T31R4	T8R4	T39R4	T32R4	T41R4	T36R4	T7R4	T22R4	T14R4	T38R4	T4R4	T11R4	T44R4	T12R4
	T16R4	T33R4	T13R4	T37R4	T3R4	T6R4	T23R4	T17R4	T15R4	T21R4	T27R4	T43R4	T29R4	T42R4	
	T22R5	T23R5	T36R5	T20R5	T38R5	T39R5	T1R5	T6R5	T44R5	T27R5	T26R5	T5R5	T15R5	T32R5	
	T18R5	T43R5	T40R5	T34R5	T37R5	T29R5	T3R5	T19R5	T8R5	T17R5	T33R5	T41R5	T14R5	T16R5	
	T35R5	T4R5	T21R5	T13R5	T30R5	T9R5	T28R5	T25R5	T24R5	T7R5	T2R5	T42R5	T11R5	T10R5	
	T38R6	T8R6	T44R6	T2R6	T35R6	T31R5	T19R6	T6R6	T27R6	T26R6	T25R6	T33R6	T5R6	T12R5	
	T3R6	T9R6	T34R6	T11R6	T14R6	T16R6	T7R6	T15R6	T10R6	T30R6	T22R6	T28R6	T18R6	T31R6	
	T39R6	T21R6	T36R6	T13R6	T40R6	T4R6	T41R6	T23R6	T29R6	T20R6	T43R6	T17R6	T1R6		
	T32R6	T24R6	T42R6				T37R6	T12R6							

	Date Assess	Des-14		Mei-15		Nop-15		
	age (m)	6		12		18		
<b>Treat</b>	Mean	1,0		3,9		8,6		
	Std dev	2,07		4,04		7,06		
	F-Prob	0,334		<b>0,015</b>		<b>0,006</b>		
		mean	std	mean	std	mean	std	dun
1		0,9	2,3	3,7	2,9	7,4	3,8	abcdef
2		0,9	2,3	2,8	3,0	11,1	8,6	abcde
3		1,4	2,3	3,2	3,2	8,3	9,9	abcdef
4		0,0	0,0	2,8	4,3	8,8	8,7	abcdef
5		1,9	1,4	6,9	4,6	10,6	8,3	abcde
6		1,9	2,3	6,5	9,4	11,6	11,4	abcde
7		0,5	1,1	4,6	3,4	6,0	4,8	cdef
8		0,9	1,4	4,2	2,9	9,3	4,5	abcdef
9		0,0	0,0	3,7	2,9	8,3	3,5	abcdef
10		0,9	1,4	5,6	3,5	14,8	6,5	abc
11		1,9	2,3	7,4	5,2	9,3	7,0	abcdef
12		0,5	1,1	3,2	3,2	6,5	4,5	bcdef
13		0,0	0,0	2,3	2,1	9,3	3,8	abcdef
14		0,0	0,0	3,2	2,1	11,1	5,0	abcde
15		0,5	1,1	4,2	2,3	9,3	4,5	abcdef
16		2,8	1,8	6,9	6,3	10,2	6,3	abcde
17		0,5	1,1	3,7	2,9	5,6	3,0	cdef
18		1,9	2,9	6,5	3,4	7,9	3,2	abcdef
19		3,2	5,4	7,4	8,0	10,2	9,4	abcde
20		0,0	0,0	1,4	3,4	5,6	4,3	cdef
21		0,9	2,3	2,8	2,5	9,7	7,2	abcde
22		0,9	2,3	5,6	5,6	14,8	11,7	abc

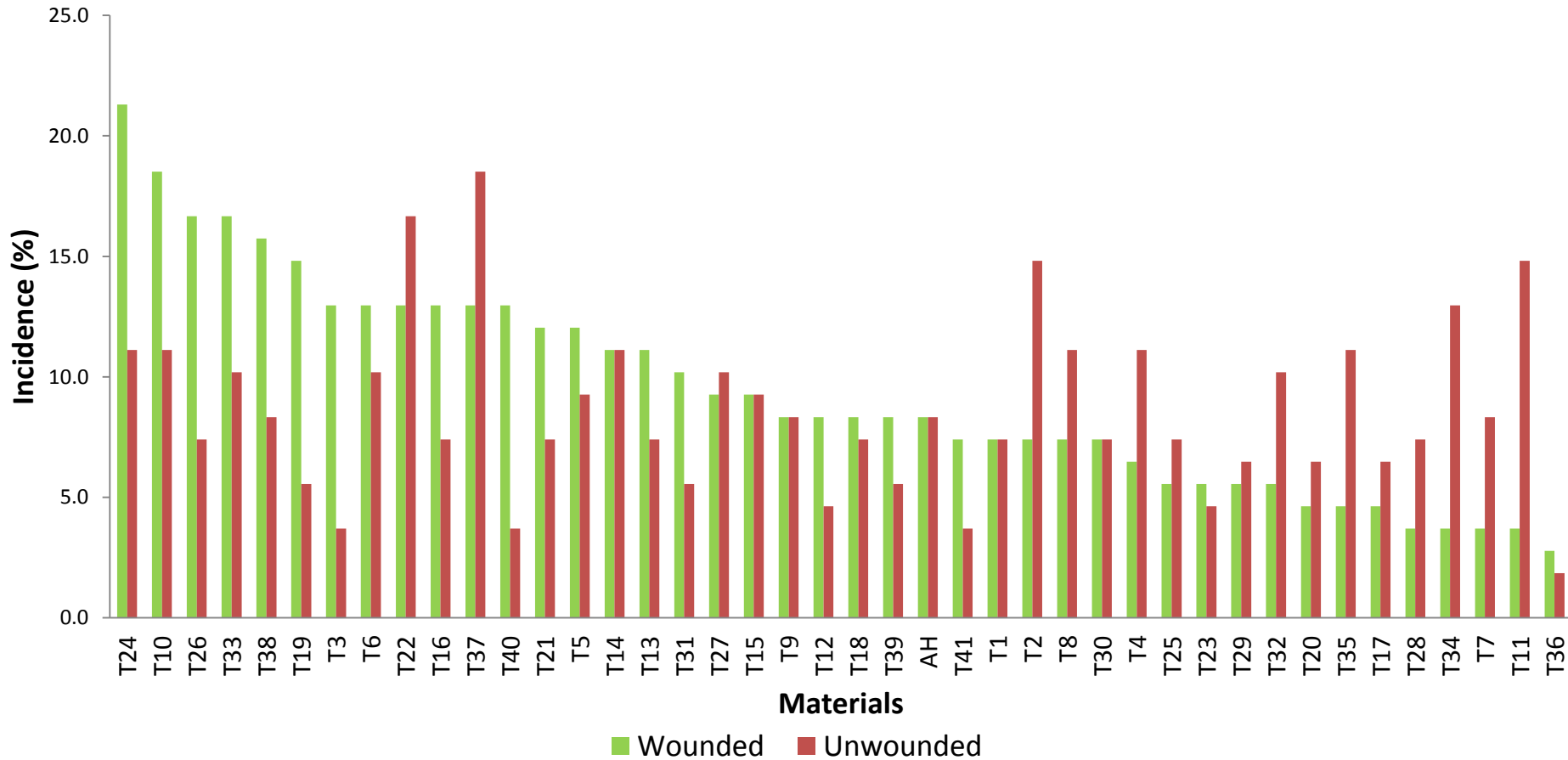




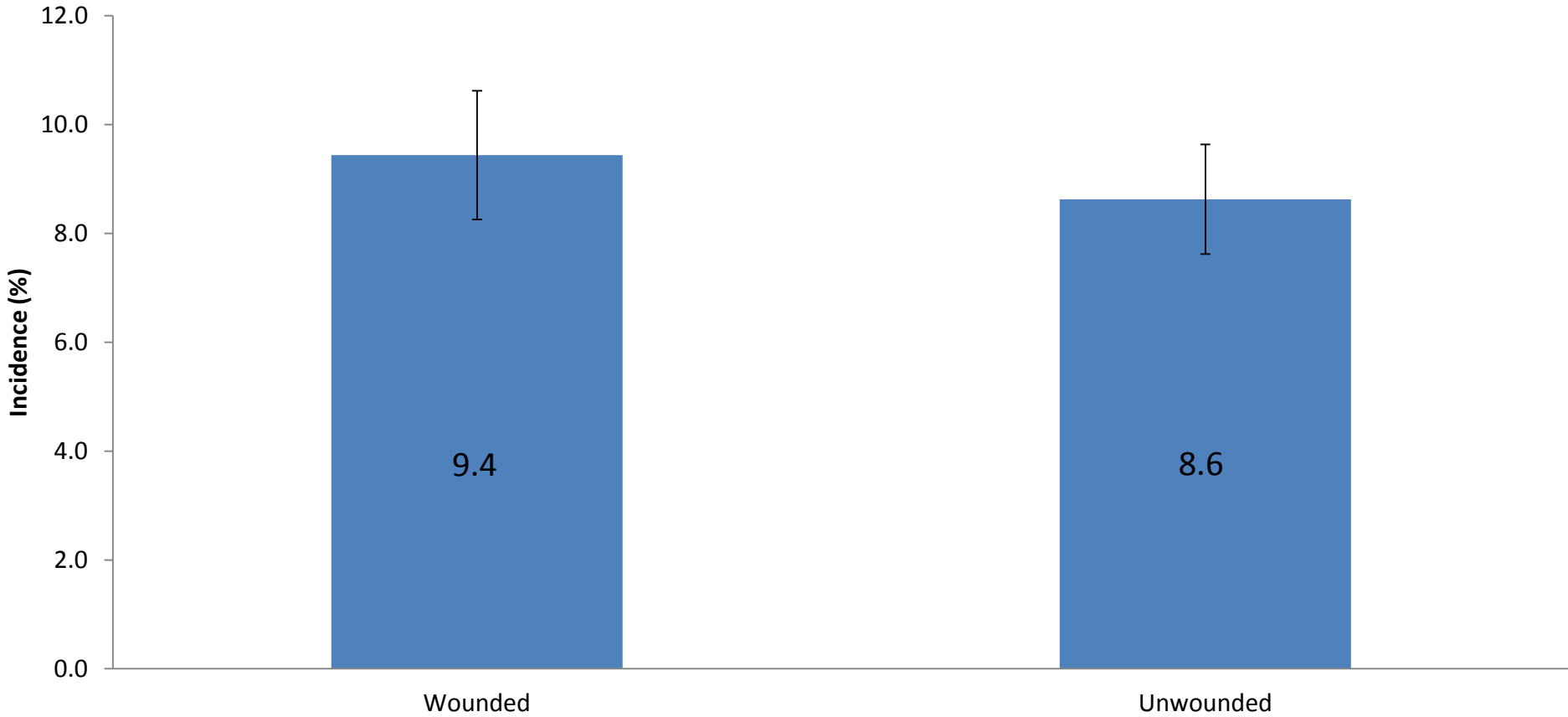
# *Ceratocystis* incidence in Baserah I027 at 18 months



***Ceratocystis* incidence in wounded and unwounded *Acacia mangium* materials in Baserah I027 at 18 months (9 months after wounding)**



***Ceratocystis* incidence in *Acacia mangium* in Baserah I027 at 18 months  
(9 months after wounding)**



## Site 2

**Trial Code : AMFPD103**

**Title** : Level of *Ceratocystis* natural infection in some *Acacia mangium* materials

**Objective** : To evaluate variation in tolerance/susceptibility in *A. mangium* materials to *Ceratocystis* natural infection

**Location** : J060 Baserah

**Area** : 6.5 ha

**Rotation** : 4

**Material** : 45 AM + 1 AC + 1 EH materials

**Established** : January 2014

**Duration** : 5 years

**Trial Design** : RCBD

**Replication** : 6

**Plot size** : 6 trees x 6 trees

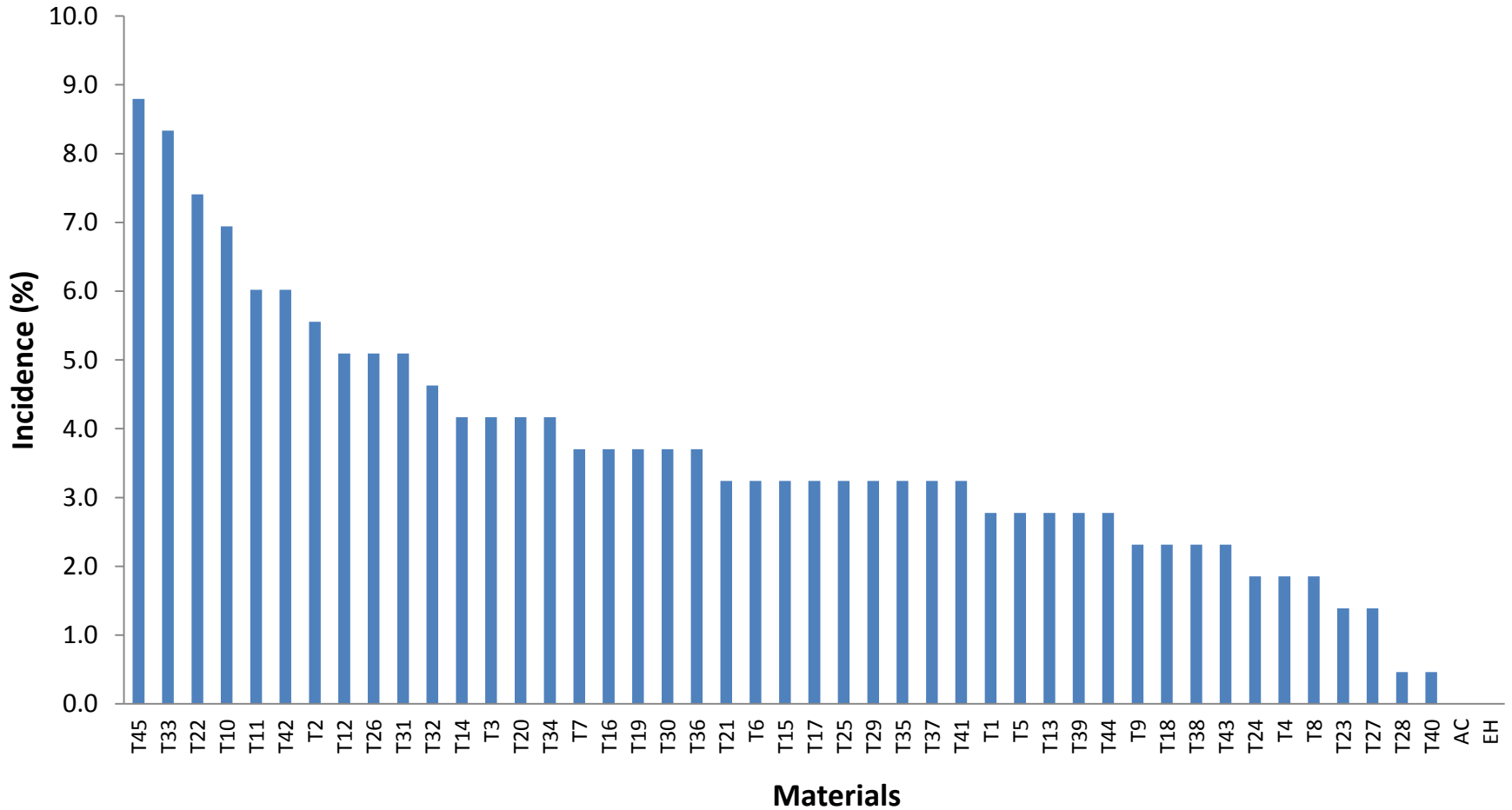
**Spacing** : 3 m x 2 m (initial stocking 1667 trees per ha)



		Ceratokystis (%)							
Asdate		Jun-14		Jan-15		Agust-15		Jan-16	
age (m)		6		12		19		24	
Treat	Mean	0,7		1,4		2,8		3,5	
	Std dev	1,84		2,61		4,09		4,61	
	F-Prob	0,129		0,162		0,372		0,316	
		mean	std	mean	std	mean	std	mean	std
1		0	0	0	0	2,3	4,5	2,8	4,3
2		0,5	1,1	0,9	1,4	4,6	7,4	5,6	8,1
3		1,4	2,3	2,8	2,5	3,7	4,2	4,2	4,6
4		0,9	1,4	1,4	2,3	1,9	3,4	1,9	3,4
5		0	0	0,9	1,4	1,9	2,3	2,8	3
6		0,9	1,4	2,3	3,2	2,8	3	3,2	2,7
7		0,9	2,3	1,4	2,3	2,8	3	3,7	2,9
8		0	0	0,9	1,4	1,4	2,3	1,9	3,4
9		0	0	0,5	1,1	1,9	2,3	2,3	3,2
10		1,4	2,3	4,2	4,6	6,5	5,5	6,9	5,8
11		0,5	1,1	0,9	1,4	5,6	7,5	6	7,3
12		0	0	0,9	2,3	5,1	8,3	5,1	8,3
13		0	0	0	0	2,8	3,5	2,8	3,5
14		2,8	3,5	3,2	2,7	4,2	3,8	4,2	3,8
15		0	0	2,3	3,2	2,8	3,5	3,2	3,7
16		1,9	2,3	1,9	2,3	3,7	3,8	3,7	3,8
17		0,9	1,4	0,9	1,4	2,3	2,1	3,2	3,2
18		0	0	0	0	0,9	1,4	2,3	2,1
19		0,5	1,1	1,4	2,3	2,3	2,7	3,7	3,4
20		0	0	0,9	1,4	2,3	3,7	4,2	2,9
21		0,9	1,4	0,9	1,4	2,3	1,1	3,2	1,1
22		0	0	0,9	2,3	5,6	8,8	7,4	9,2
23		0	0	1,4	1,5	1,4	1,5	1,4	1,5
24		0	0	0,9	1,4	1,9	2,3	1,9	2,3

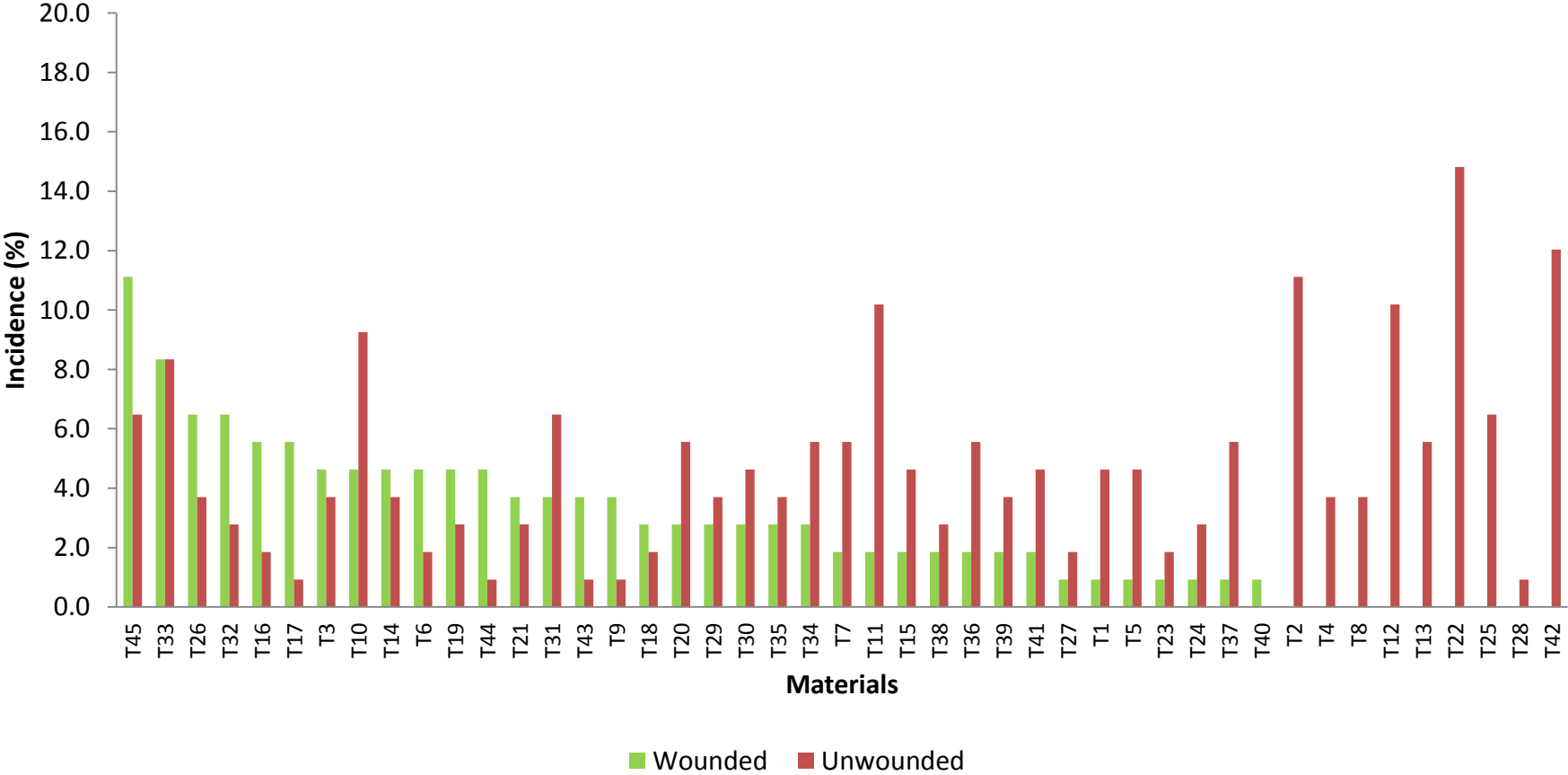


# *Ceratocytis* incidence in Baserah J060 at 24 months

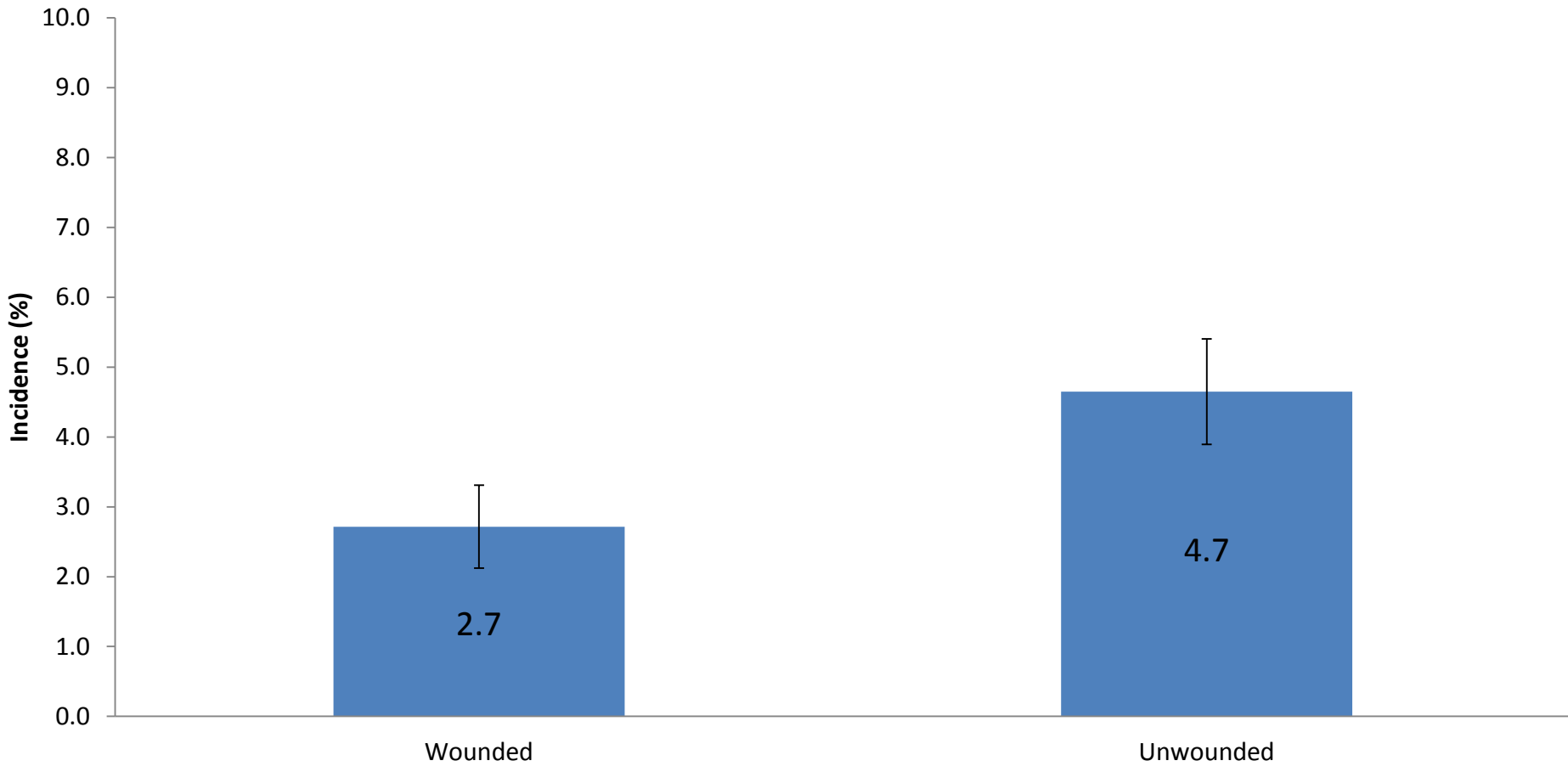




***Ceratocystis* incidence in wounded and unwounded *Acacia mangium* materials in Baserah J060 at 24 months (11 months after wounding)**



***Ceratocystis* incidence in *Acacia mangium* in Baserah J060 at 24 months  
(11 months after wounding)**



# Operational Plantation

## TEE C027

Compartment	: C027 Teso East
Planting date	: 15 May 2016
Area (Ha)	: 23.6 Ha
Species	: <i>Acacia mangium</i>
Seed lot	: FAM 0025
SMU	: C
Rotation	: 04
Spacing	: 3 x 2 m (1667 trees/ha)

# Inventory Damage Summary Compartment C027 TEE

No	PMA	Inventory Date	Stocking (%)	Damage (%)			
				Wind	Monkey	Elep/Buff	<i>Ceratocystis</i>
1	18	07 November 2015	80	0.2	1.7	0	0.5

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**Effect of Singling on *Acacia mangium*  
Survival at Age 2 Years**

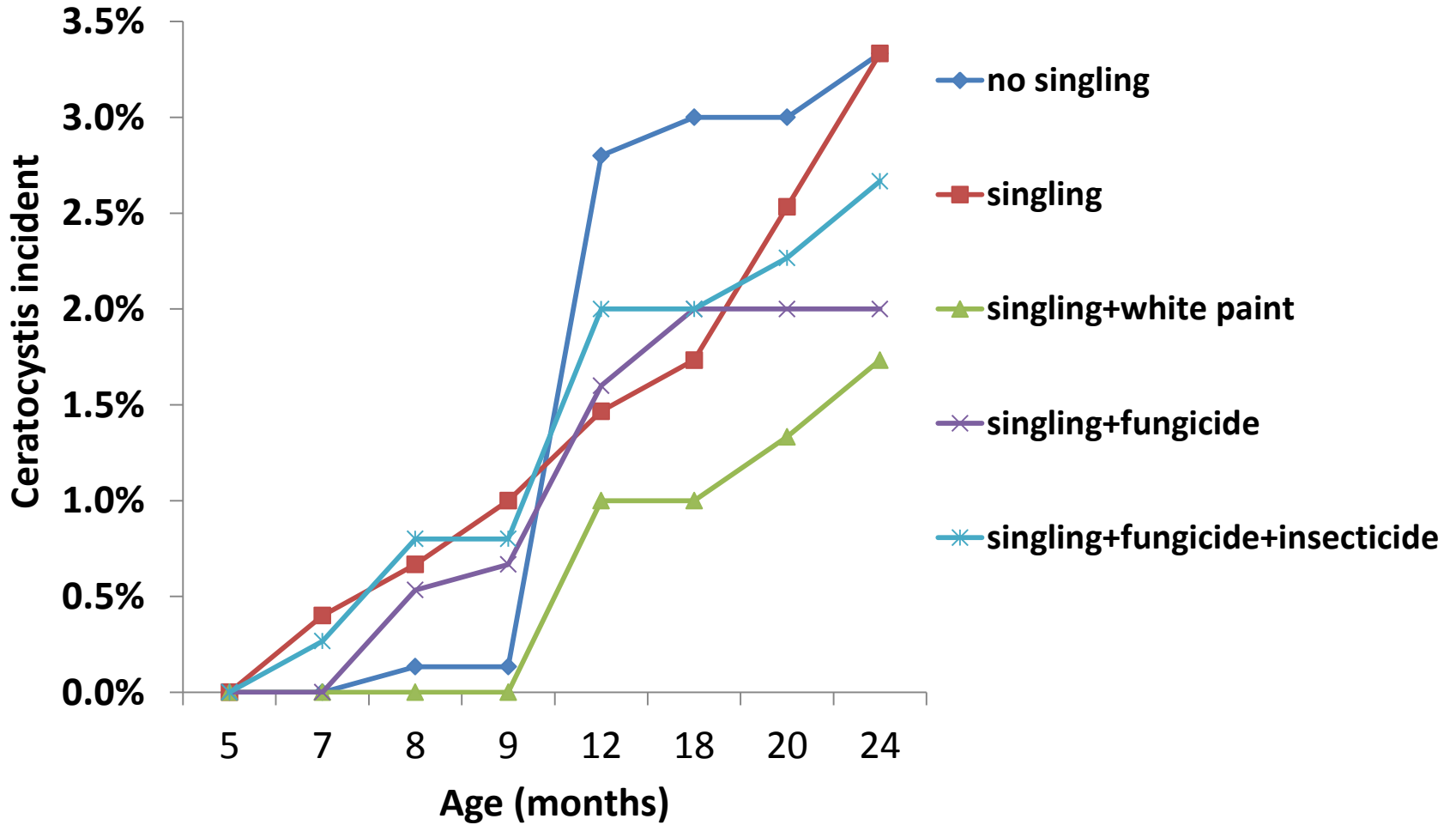
# Background

- *A. mangium* mortality loss to *Ceratocystis* is also considered to be related to man-made wound such as singling/pruning
- Singling is needed to improve stem quality (stem form and growth) although only 30-40% of trees only need singling
- Mortality due to *Ceratocystis* in unsingled stand also happens
- If singling still needs to be done, what treatments can be done to reduce mortality after singling?

# Methods

- Trial Code : AMTND40
- Design : RCBD; 5 replicates
- Location : Teso East F006
- Planted : March 2013
- Established : September 2013 (at age 6 months)
- Genetic : FAM0016 (Cuttings; CP material)
- Plot size : 10 x 15 trees
- Spacing : 3 x 2 m
- Treatments : No singling  
Singling (no scar treatment)  
Singling + white oil paint  
Singling + fungicide (Bavistin)  
Singling + fungicide (Bavistin)+  
insecticide (Confidor)

# *Ceratocystis* (based on total count)





# Interim Conclusion

- Difficult to directly correlate singling and *Ceratocystis* incidence
- Plot variation may reflect the variation of inoculum
- However, scar treatment with oil paint (which cover the wound) may reduce or slow down the infection until 2 years
- Application of fungicide or insecticide to singling scar is not effective

**Thank You**