

Nursery and Christmas Tree Pest Management

- Principles of IPM For Nursery and Christmas tree production
- Using IPM to meet production objectives
- Types of Nurseries from greenhouse to in ball and burlap production.
- Domestic vs export markets

What is the difference between a greenhouse and a Nursery?



Hoop Houses For Perennials



Open Hoop Houses for Containers



Containers Without Hoop Houses



Mixed Production



Intensive Container Production in MI



Intensive Container Production in California



Boxed Trees in California



36" NS

Growers-to-you

SPECIAL

Sequoia 'Saguel'

\$450⁰⁰

REG \$550⁻

RELEASED FROM TREELAND FARMS (Wholesale Division)

Large Pot (Box) Production in IN



Box Production of Large Trees



Drip-line Irrigation in IN



Box Production of Oleander in CA



Retail Boxed Trees in California



Retail Pots in California



Wire frames keep plants standing



Container Nursery



Pot-in-Pot to Keep Plants Standing



In Ground Nurseries in South Bend



In Ground - Conifer and Deciduous Nursery in MI



Conifer Production Nursery

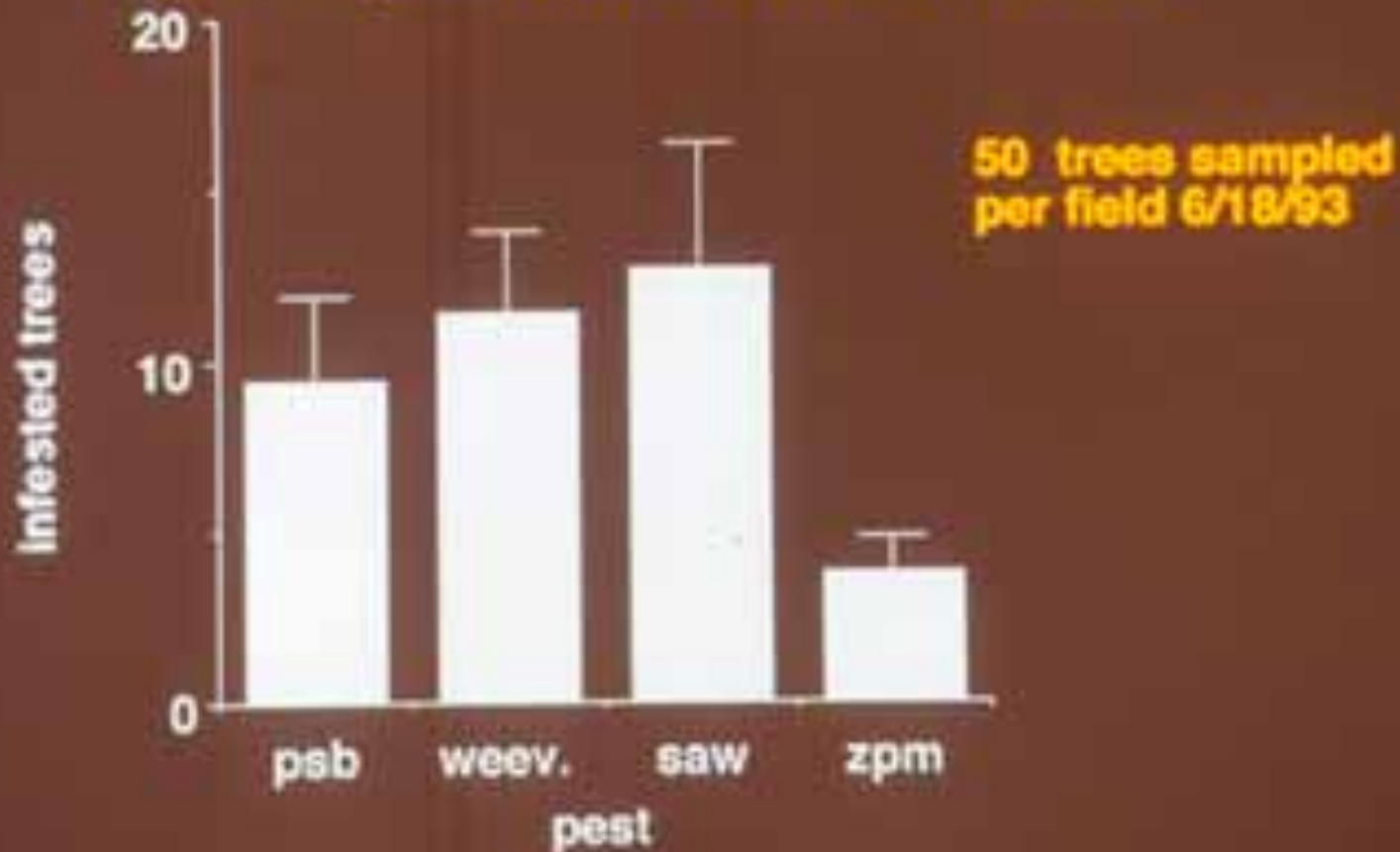


Christmas Tree



Pests of Christmas Trees

Frequency of infested trees in 7 quarantined fields



Practices that Favor Pests



Treat Stumps



Burn Refuse Piles

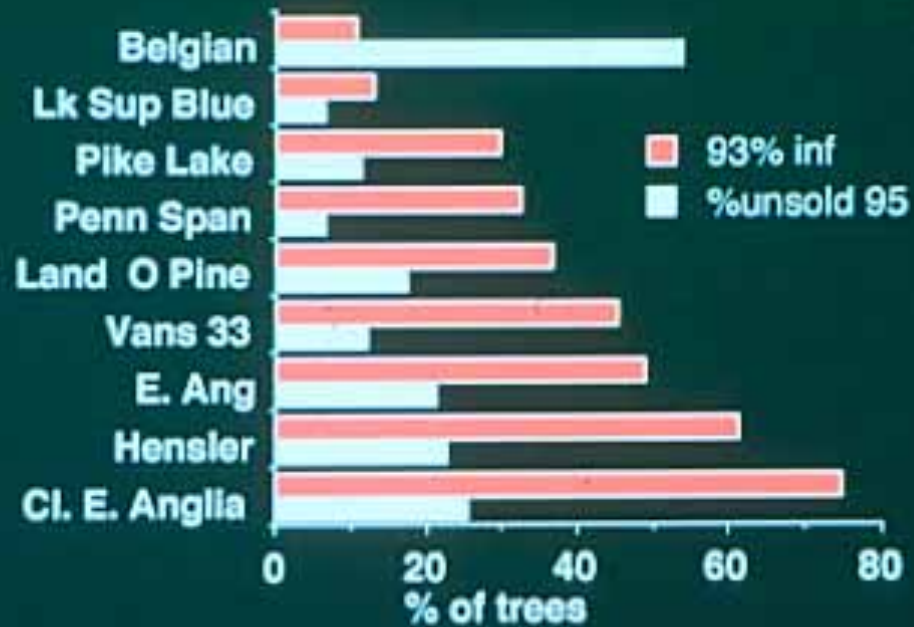


Zimmerman Pine Moth Damage



Evaluation of Resistant Varieties

93 ZPM Infested and 95 Unsold



Integrated Pest Management Strategy

ZPM Management Strategy for new fields

Year 1- 4 (keep them out)

**Scout and Spot Treat, or
Cover spray in April (100 gal / Acre)**

Year 5-9 (coast)

**No Sprays (penetration probs)
Cull Heavily Infested trees**

Export Ornamental IPM



<http://www.entm.purdue.edu/Entomology/research/cs/pdf/cleanstock.pdf>



Air Layering







Shipping


ARCO IRIS DEL CARIBE S.A.

COSTA RICA
Fax: (506) 718-6787
Apdo 360-8150
Santa Ana

TO Excelente Foliage

PLANT Bacopa Florida Beauty

SIZE 10 TYPE ORC QUANTITY 400



Inspecting Plants In Miami



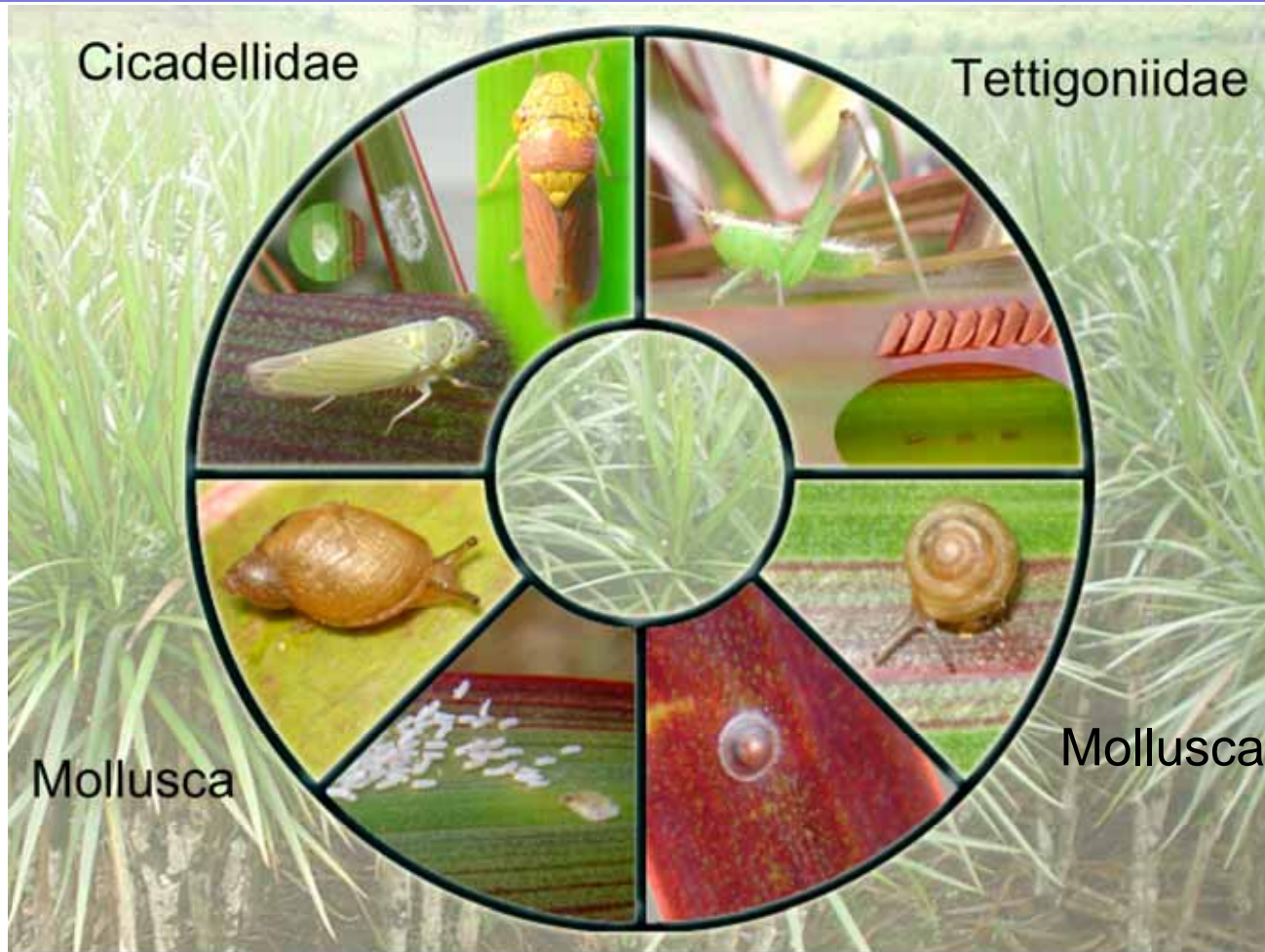
Analysis of PIN Database Identified CSP Targets



<u>Taxa</u>	<u>% total¹</u>
Leafhoppers	41.05
Katydid	23.26
Snails	6.58
<u>Armored scales</u>	<u>3.76</u>
Total	74.55

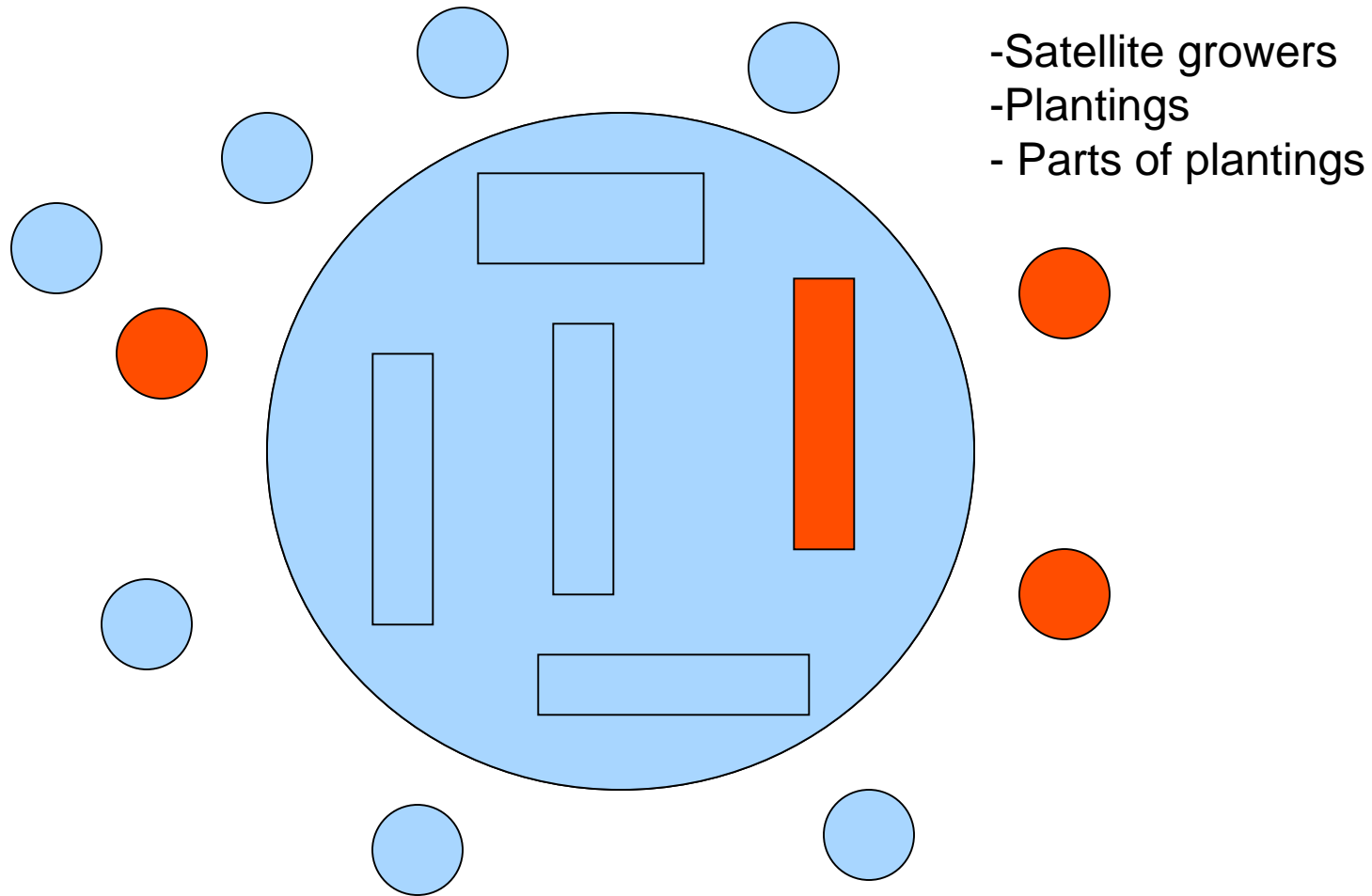
¹17037 interceptions on Dracaena between
1984 and 2004

Target Quarantined Pests



Diaspididae

Use IPM to Identify location of problems to target management efforts



Traceability



INGRESO

Dinier Arias Chacón

Cédula N° 2-533-653
Tel/fax. 475-1279 / 882-2974
50mts. Sur de la Iglesia Católica de Bajo Rodríguez, San Ramón.

PROVEEDOR:

Wilson Esquivel

FINCA:

CONTROL DE INGRESO

Nº

097

Semana	DIA	MES	AÑO
48	27	11	2007

Fecha	Lote	Variedad	Medida	Cantidad	Tipo	Empacado	Otros
	1	Verde	42"	3900	ΔC		
	2	Verde	39"	4000	ΔC		
	3	Verde	60	50	ΔC		
	3	Verde	54	100	ΔC		
	3	Verde	42	150	ΔC		
	3	Verde	36	100	AL		
	3	Verde	30	150	AL		
	3	Verde	18'	200	AL		
	3	Verde	12"	150	AL		
	Unidades	Medida					
	29-55-58-55	42					
		Variedad					
		Verde					
		Tipo					
		AL					

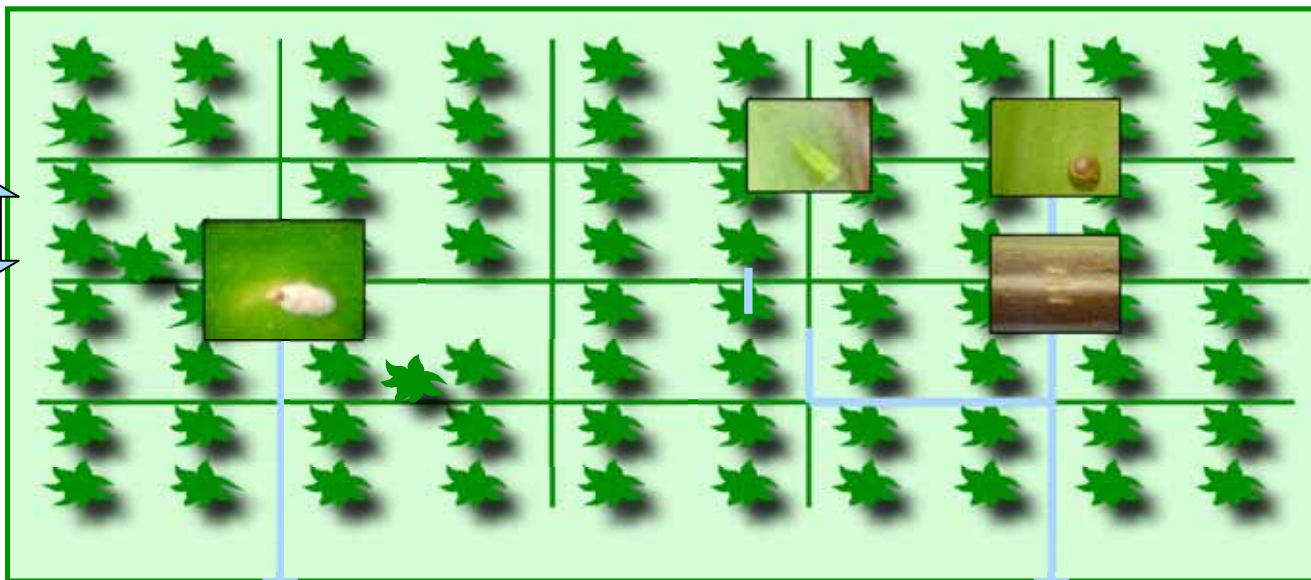
Medida	Variedad	Tipo	Valor	Otros
54"	Verde	ΔC		
48	Verde	ΔC		
36	Verde	ΔC		
40"				
80				
80				

Biyo
Biyo
Case

Developing a Sampling Method

Systematic Sampling

10x10 m



Sampling of:
Cicadellids
Tettigoniids
Scales
Snails



8 leaves



8 tips

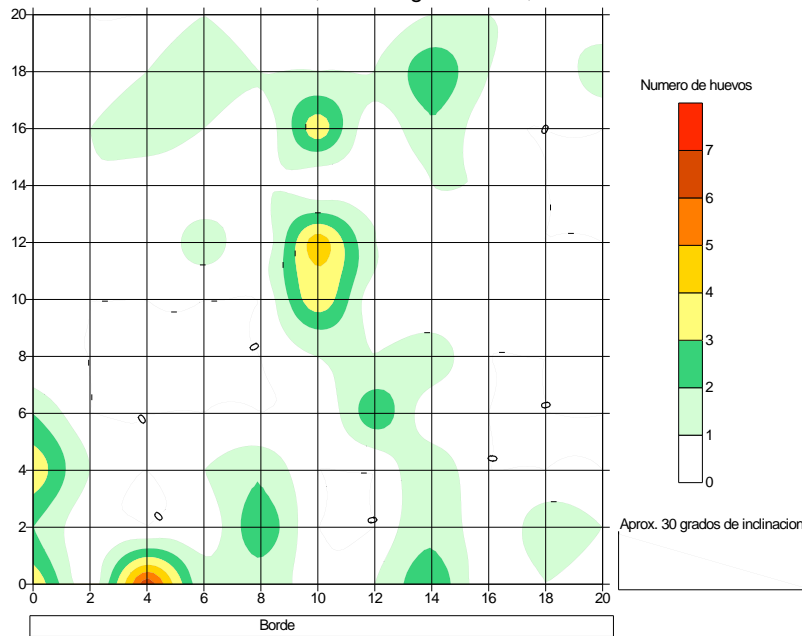
Thirds

Cane
Bud

Confirmation of Sampling Accuracy

Map generated with data taken on a 2x2 meter grid

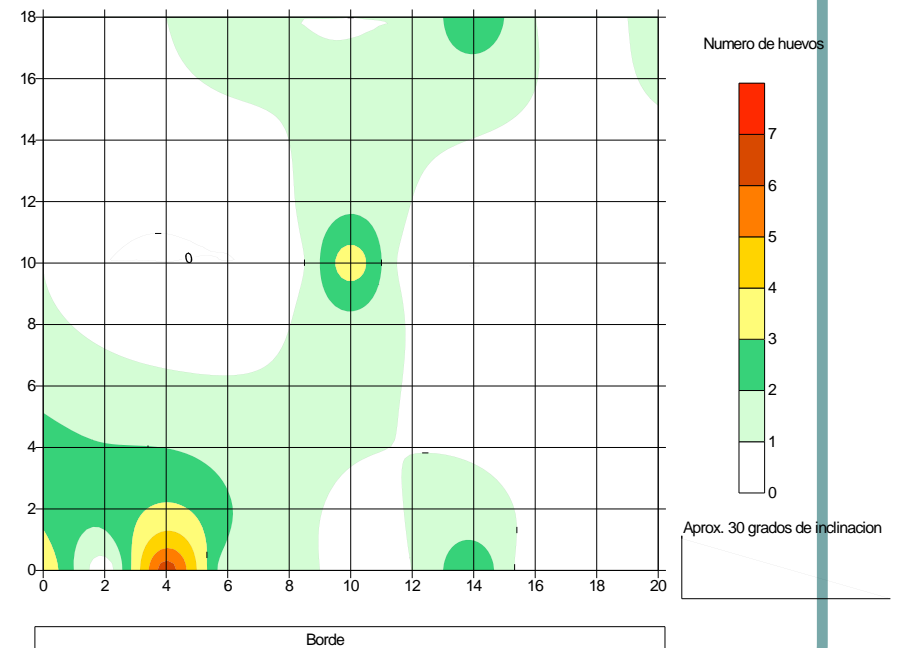
Distribucion de huevos en cuadrícula 2x2m, Lote marginata verde, Luis Jimenez



Average /point = 0.81 ± 0.11

Map generated interpolating data taken on a 10x10 meter grid

Distribucion de huevos en cuadrícula 10x10m, Lote marginata verde, Luis Jimenez



Average /point = 1.15 ± 0.24

Farmer Practices and Pest Abundance

Target pest

Variable	Cicadellid	Tettigoniid	Scales	Leaves w/scales	Snails
Fertilization	0.0337 ↑	0.0050 ↓	0.0019 ↓	0.0072 ↓	0.4262
Insecticide	0.0022 ↓	0.0041 ↑	0.0524 ↑	0.0337 ↑	0.9949
Herbicide	0.0019 ↓	0.0100 ↑	0.0068 ↓	0.0515 ↓	0.4317

P - Values for test of independence. Arrow indicates direction of categorical relation