CHAPTER 2

A seven-year study of individual variation in fruit production in tropical

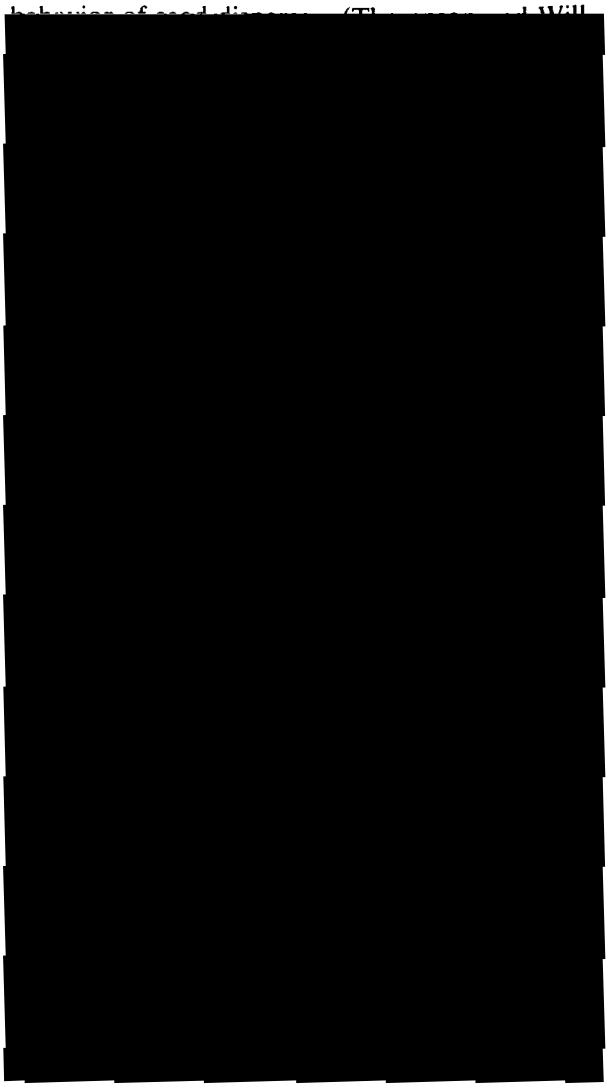
NATHANIEL T. WHEELWRIGHT*

Key words: Lauraceae, seed dispersal, frugivory, tropics, masting, phenology, plant reproduction, annual variation in fruit production

Abstract. Fruit crop sizes varied from year to year

Introduction

* Present address: Department of Biology, Bowdoin College Brunswick, Maine 04011, USA

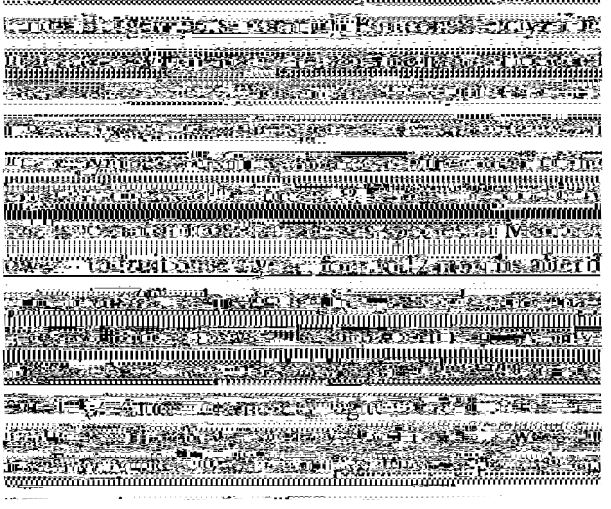


Study area

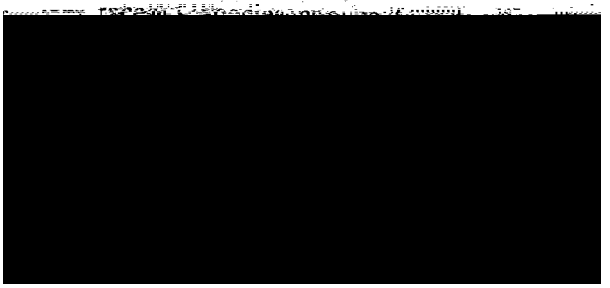
The study area covers 15 km² of lower montane wet

Species

At least 22 bird-dispersed lauraceous tree species occur in the same or adjoining habitats at Mon-



wasps. In any month of the year, at least one lau-



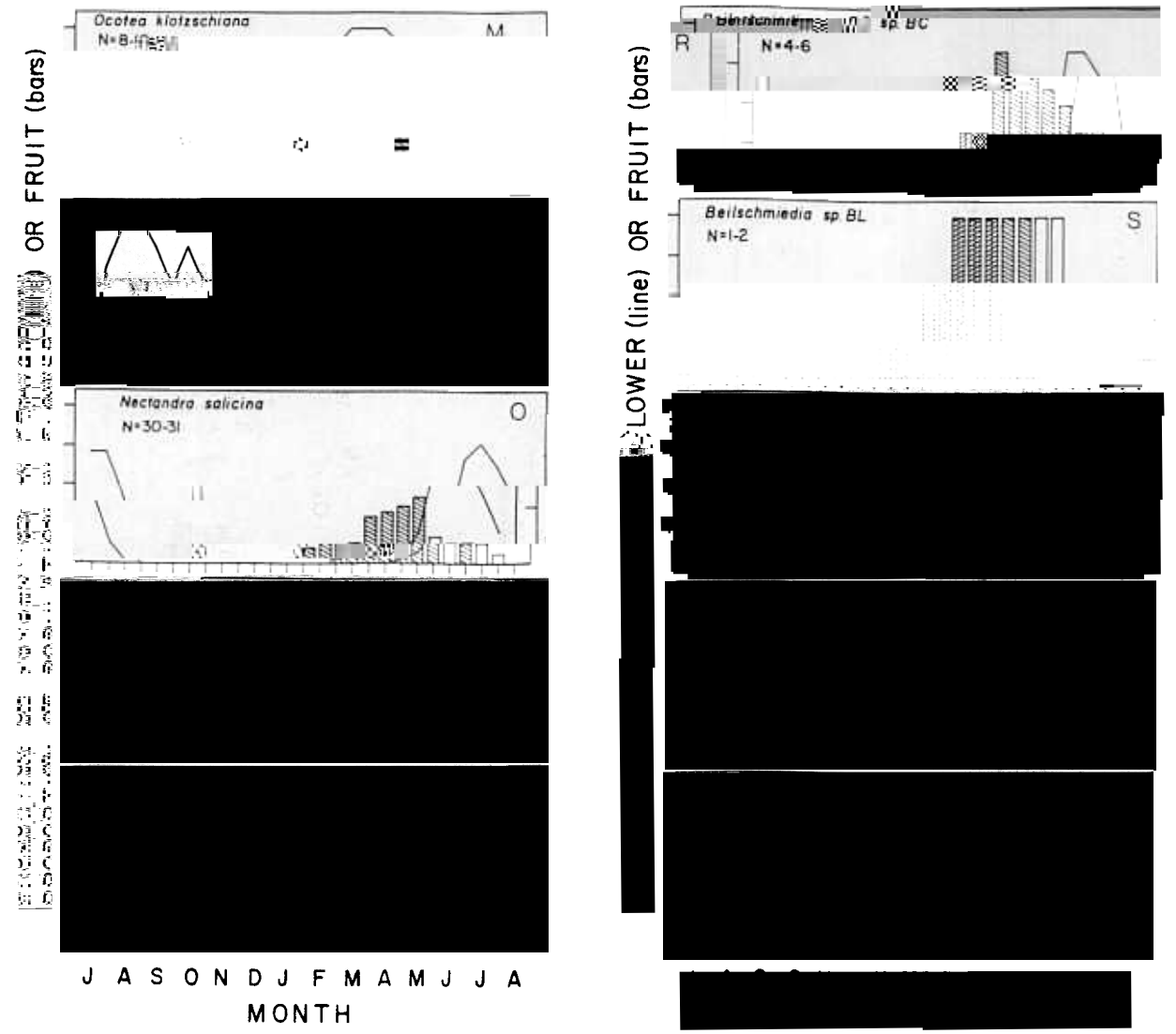


Fig. 1a–v. Seasonal flowering and fruiting phenologies of 22 bird-dispersed tree species in the Lauraceae of Monteverde, Costa Rica in

[redacted]

[redacted]

nias tricarunculata). Emerald Toucanets (*Aulaco*

[redacted]

Lauraceae quantifying reproduction in in

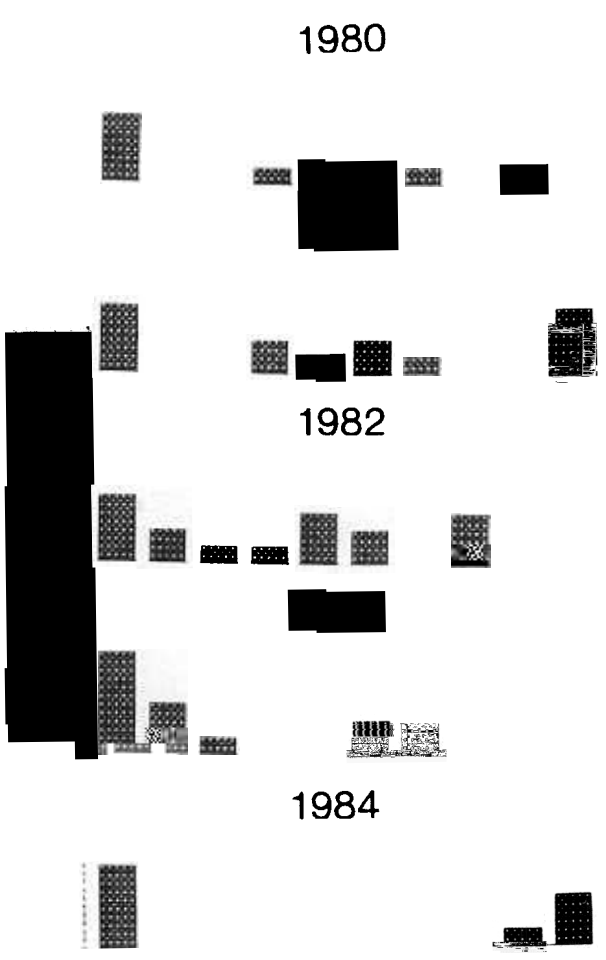
ltorea reproduction in Since June 1980 I have mon

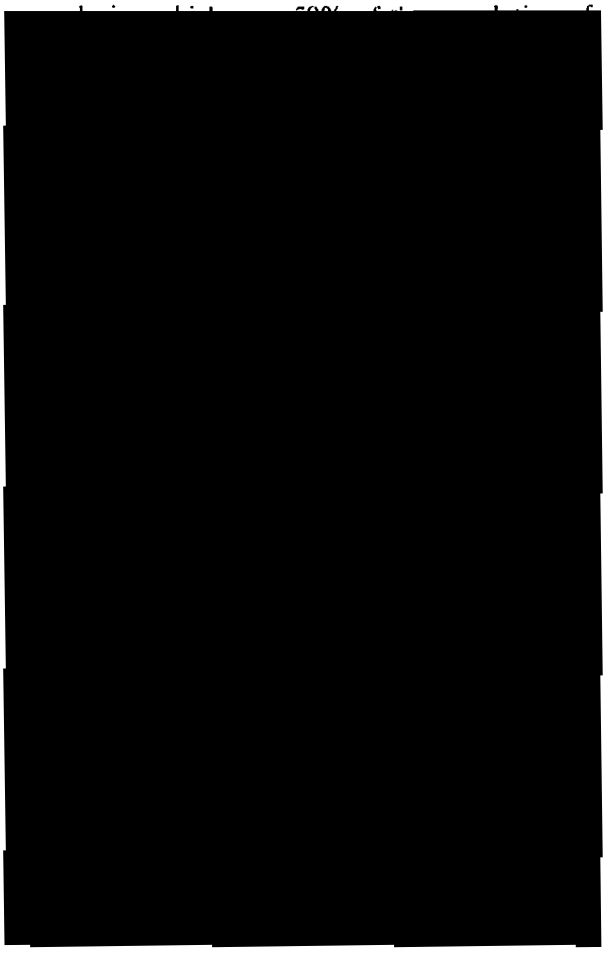
286 marked trees, representing 22 species. Individual trees of six of these species were observed during 1979 as well. For the 16 common tropical

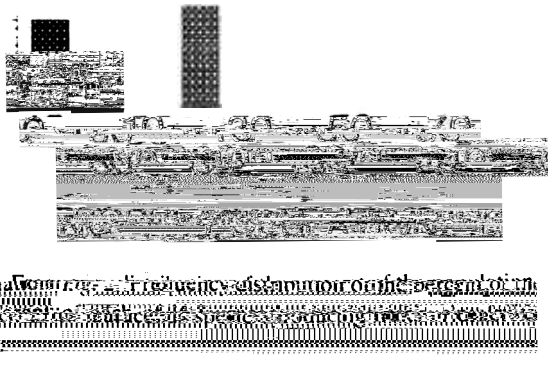
[redacted]

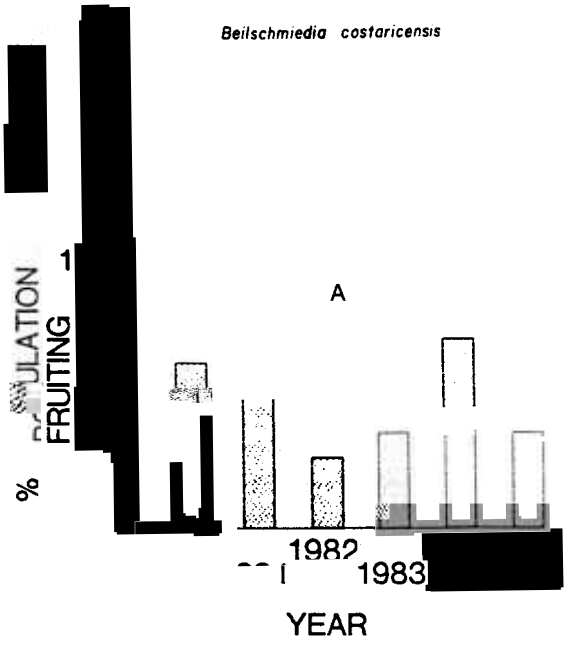
Results

Fruit production fluctuated annually [illegible]


1980
1982
1984
1985



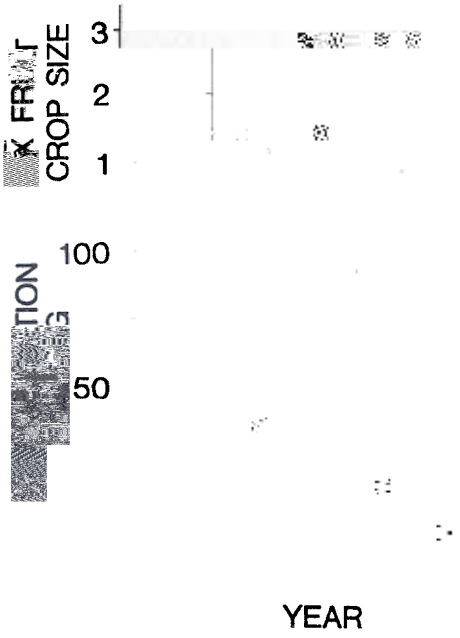


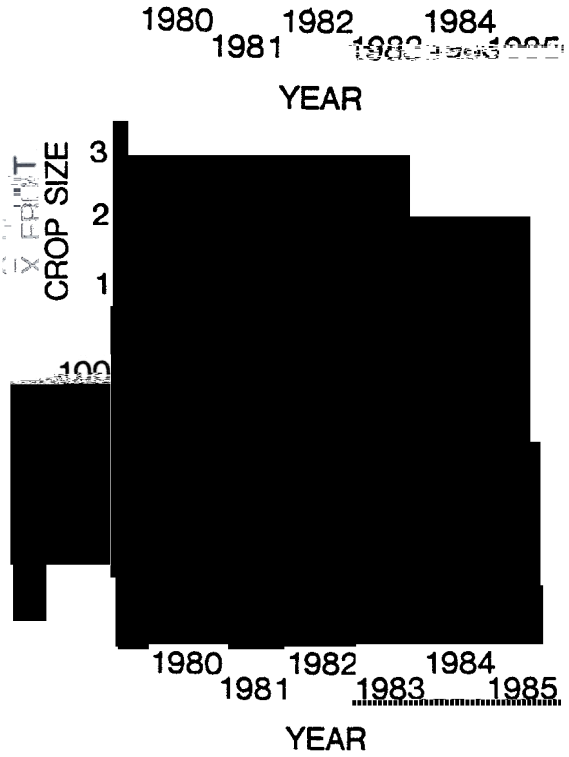

Beilschmiedia costaricensis
A
1982
1983
YEAR

Beilschmiedia sp. BC

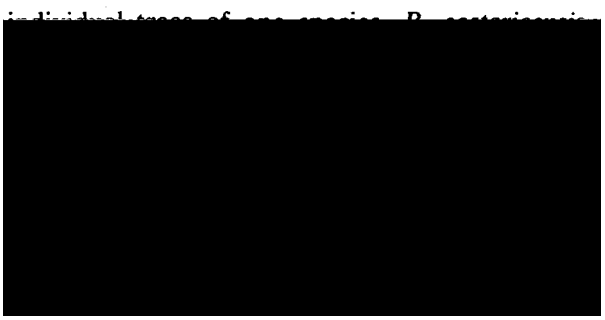
B

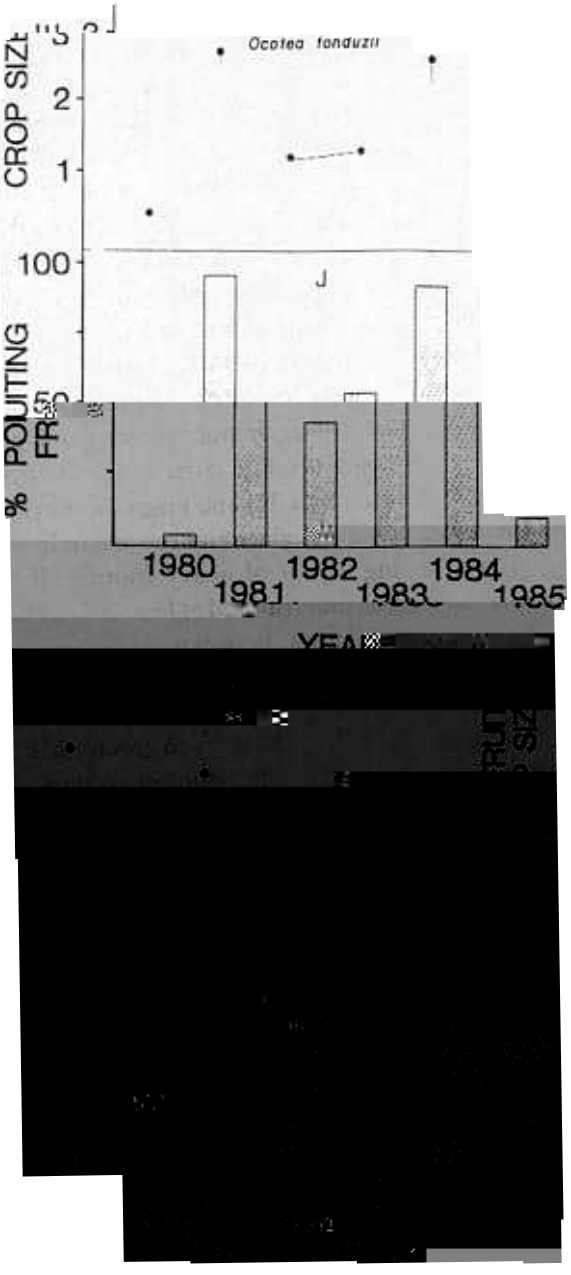
%

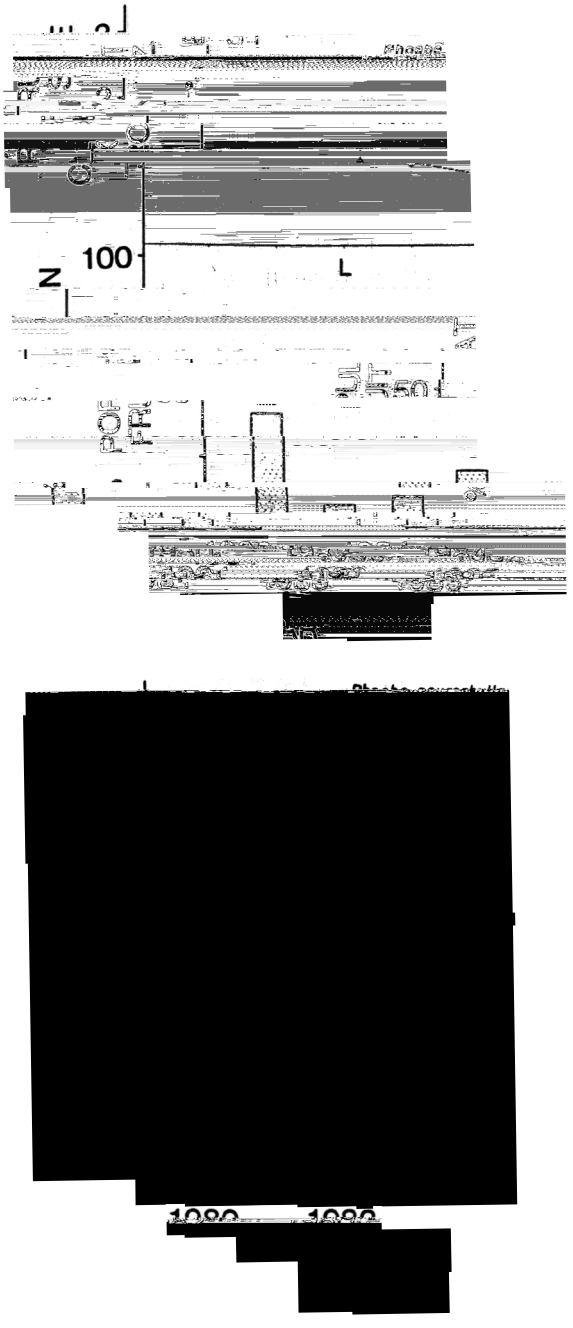

CROP SIZE
3
2
1
100
50
YEAR


1980
1981
1982
1984
YEAR
CROP SIZE
3
2
1
1980
1981
1982
1983
1984
1985
YEAR


3
YEAR

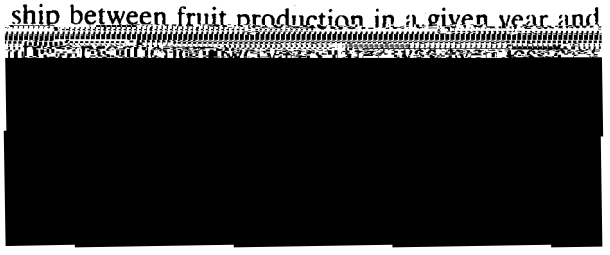


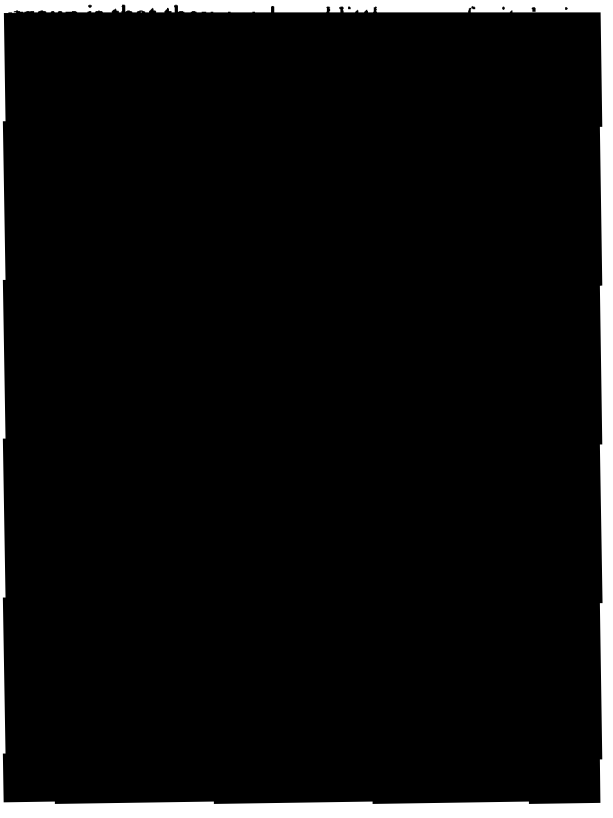




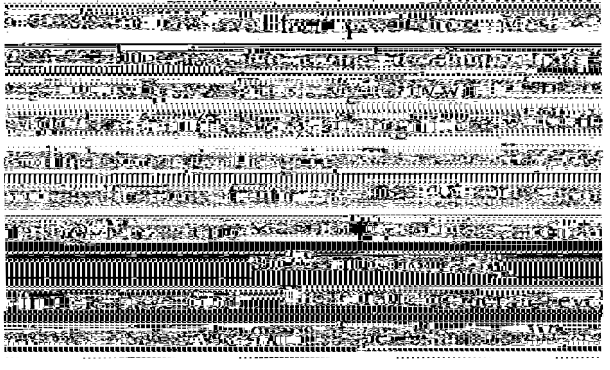
other, yet they showed distinct cycles (Table 1).

ship between fruit production in a given year and





There appear to be three general reproductive patterns within the Lauraceae: erratic moderate-level fruit production, periodic prolific fruit production,



Tree species	Correlation coefficient: current vs.	No. successive plant-years	Correlation coefficient: fruiting vs. vegetative growth	No. successive plant-years	[illegible]
[redacted]	−.22	21	−.33	27	6
	−.44**	42	−.56	55	12
	−.07	24	[illegible]	31	7
	.00	102	[redacted]	135	30
	.05	104		135	29
	−.43	21		[illegible]	6
	.58**	56		[illegible]	16
	−.28	7		[illegible]	5
	−.07	20		[illegible]	6
	.13	39		[illegible]	12
	−.42**	110		[illegible]	30
	−.18	34		[illegible]	12
	.41	12		[illegible]	3
	.23*	85		[illegible]	25
	−.03	39		[illegible]	14

* $P<.01$
$P<.05$

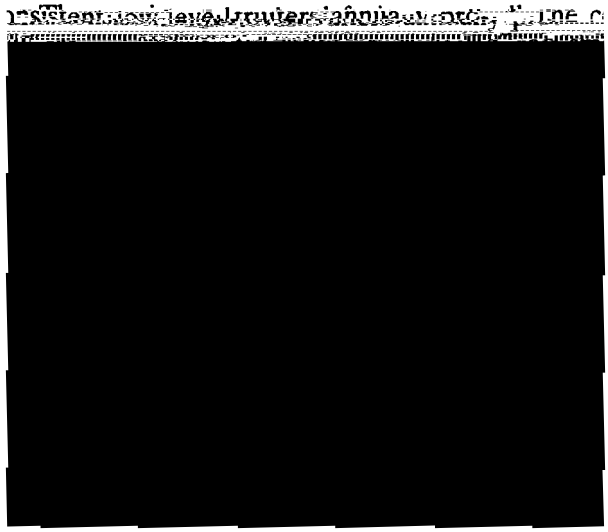


Table 3. Three general patterns of fruit production within the Lauraceae at Monteverde. Mean crop size and variability in crop size refer

Tree species	Fruit size (g)	Mean fruit crop size	Variability in crop size	Consistency of individuals
Erratic moderate level fruiters				
Phoebe mexicana			moderate	
Ph. neurophylla			moderate	
Nectandra gentlei			high	
**Persea sp. RP*			moderate	
Ocotea sp. FL			moderate	
***N. sp. NC*			[redacted]	

Importance of

[redacted]

[redacted]

[redacted]

[redacted]

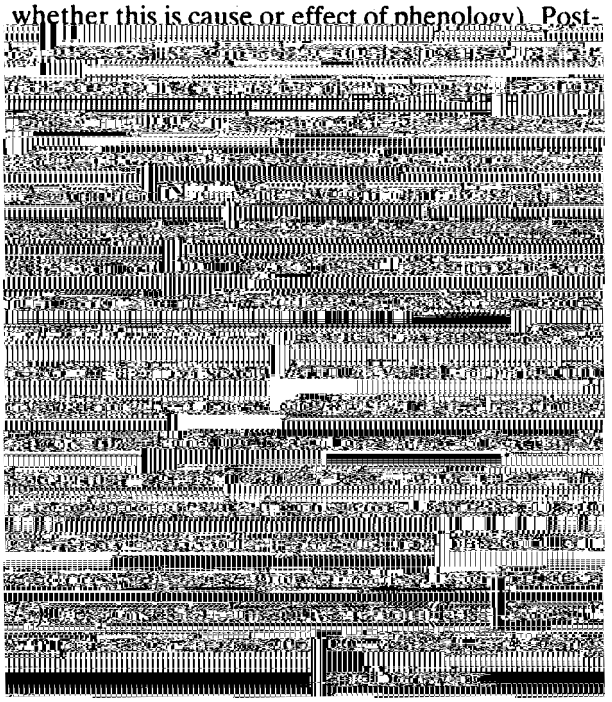
B. costaricensis	3.9	2.0	0	0
[redacted]	0.5	3.3	0	2.0
	0	0.2	0	0
	0	0	0	0
	1.1	0	72.6	0
	1.1	0	0	0
	2.2	[illegible].8	0	2.0
	0	[illegible]	0	[illegible]
	91.2	[illegible]9(7	27.4	[illegible]

Procnias seems related to their dependence on lau-
raceous fruits (Snow, 1973; see also Crome, 1975)

[redacted]

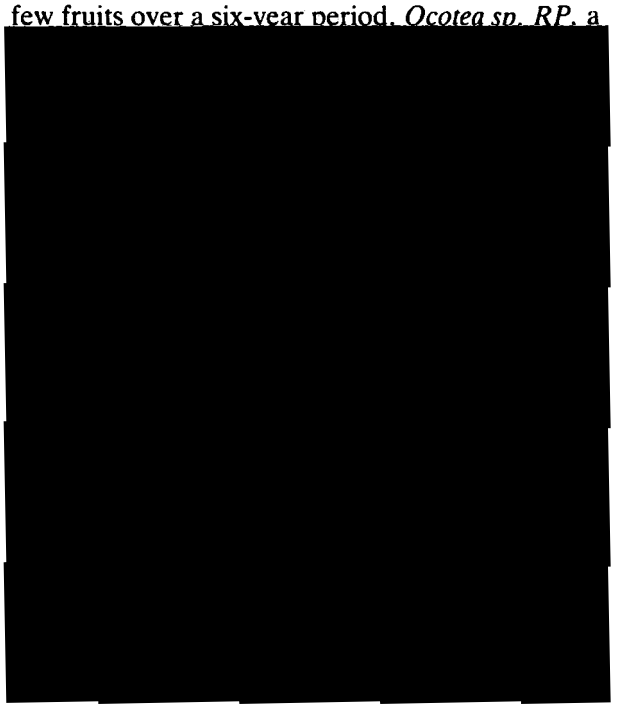
[redacted]

vere among the erratic and periodic fruiters (Table 3), and rather low in most species of consistent, low-level fruiters (although it is not obvious whether this is cause or effect of phenology). Post-

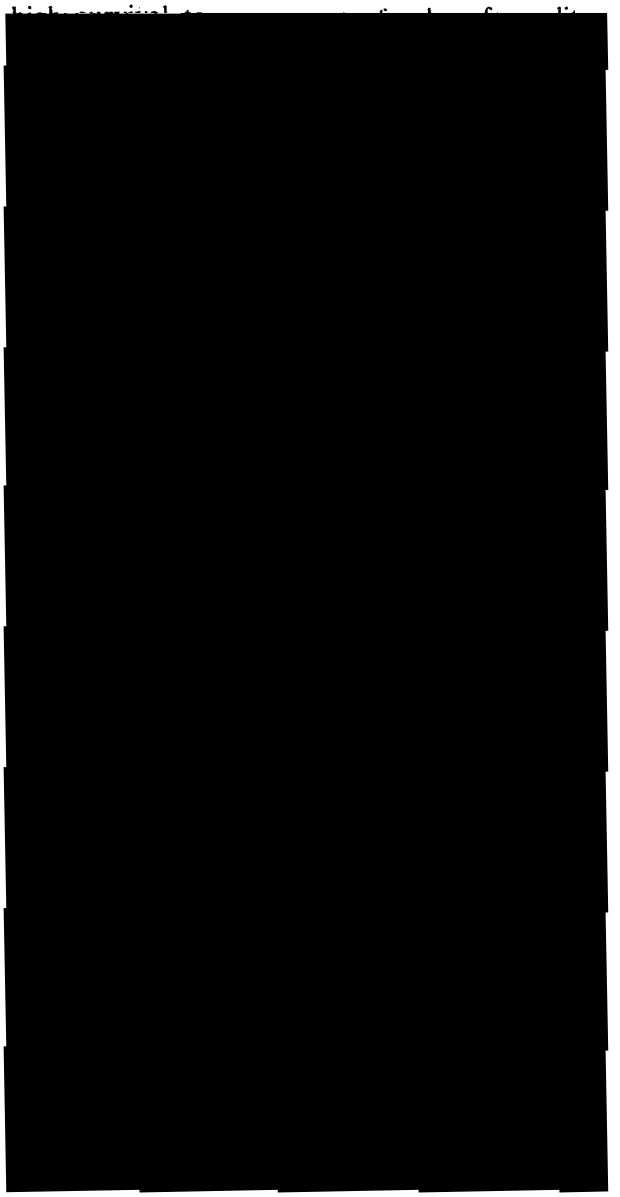


Variance in reproductive success among trees

Several species in this study produced perplexingly few fruits over a six-year period. *Ocotea sp. RP*, a

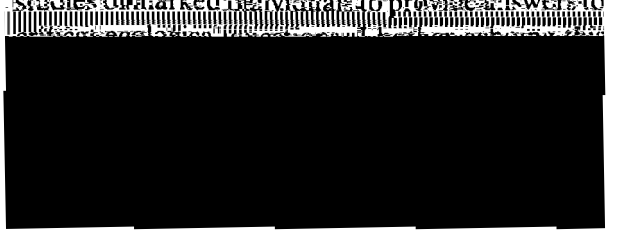


their seed or seedling biology suggests unusually

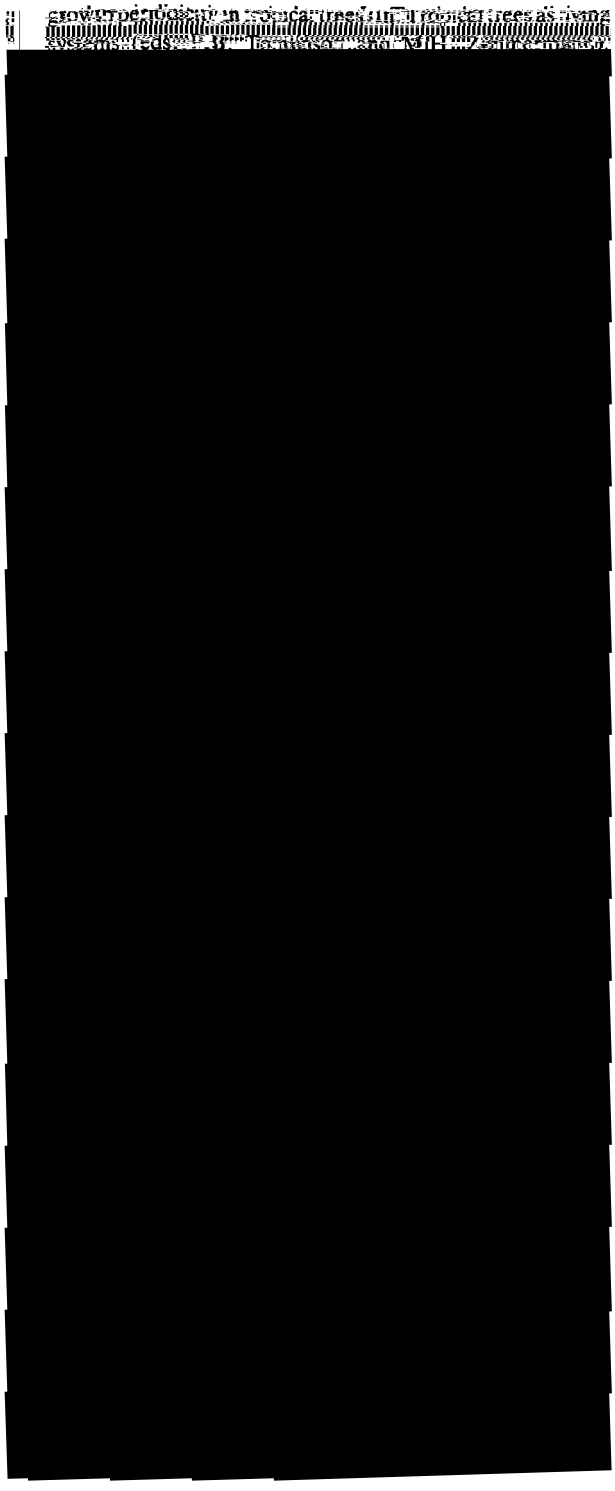


Conclusion

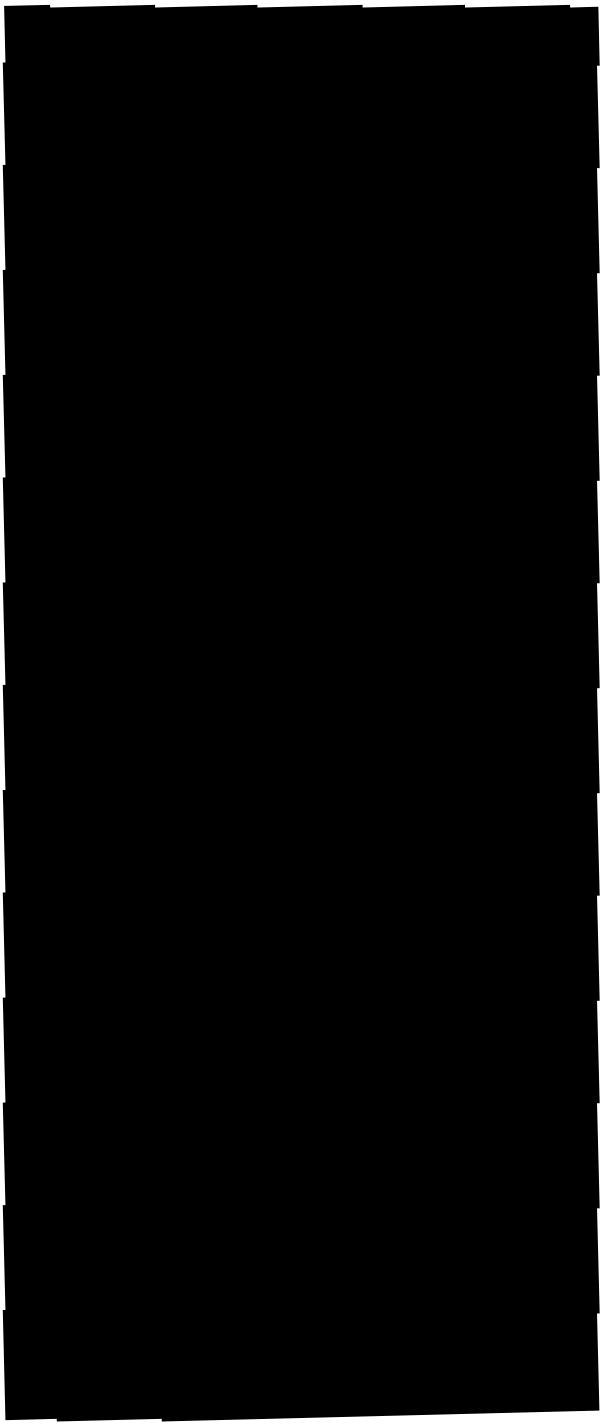
It is commonplace to note that we need long-term studies of marked individuals to provide answers to



Alvim, P. de T. and R. Alvim. 1978. Relation of climate to



Acknowledgements



cal wet and dry forests in the lowlands of Costa Rica. J. Ecology 68: 167–188.

Poole, R.W. and B.J. Rathcke. 1979. Regularity, randomness