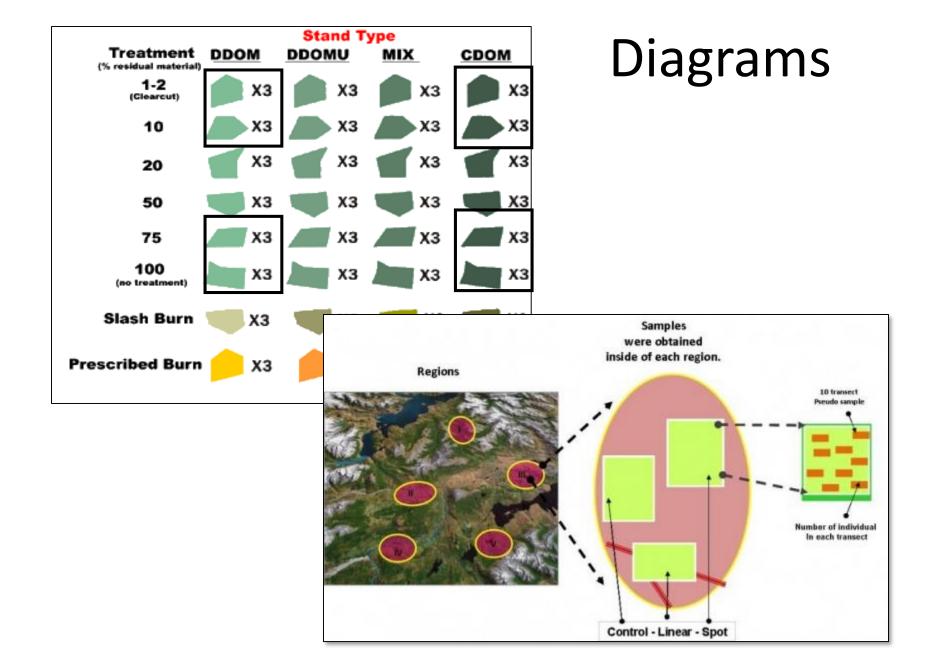
## **Project Websites**

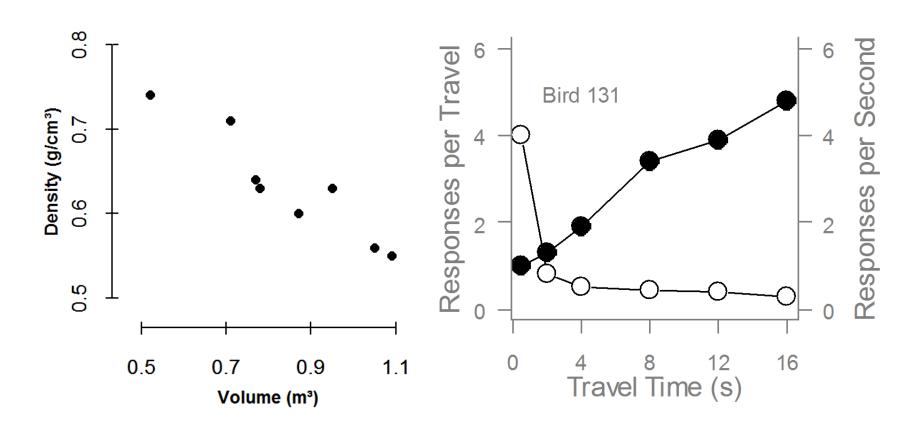
## Setting up your website

- Save your text offline in .txt files
- Use your ualberta.ca web space if you want the website to float to the top
  of google search results (see guide on course website)



## Graphics

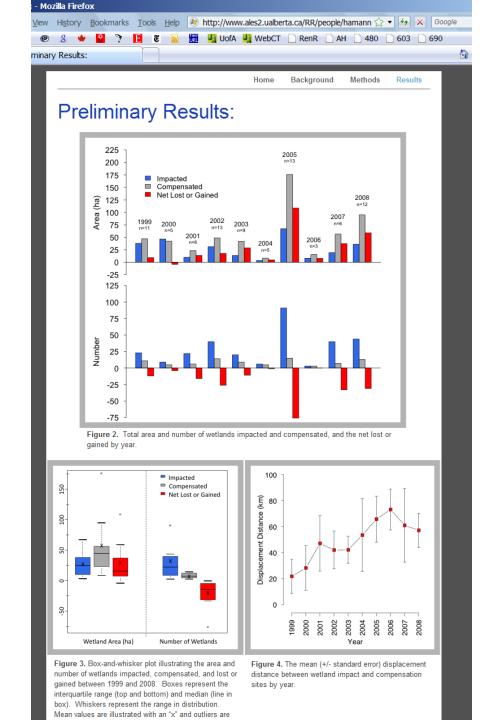
Scale with: ggsave(...,scale=2 or scale=1.6 etc)



# Graphics

### Consistency:

- Size
- Colors
- Symbols



## Scope

- Short journal paper (not in quality but in volume)
- E.g.: 5 Figures, 3 Tables
   & 2000 words (just a guideline)
- Plus data explorations (residuals, diagnostic plots, distributions)

(Fig. 5), except in 1998 (the El Niño year) when flowering occurred only later in the year. Overall fruiting activity fluctuated about twice as much as flowering.

components shows that eight species are mainly responsible for these deviations in the date of fruiting or flowering (Fig. 6). In this graph, positive scores in PCI indicate a delayed event in 1998, negative scores in

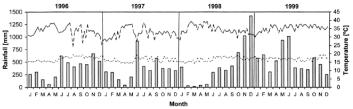
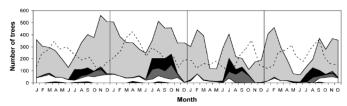


Fig. 4 Average monthly rainfall (□), and daily maximum (...) and minimum (- - - ) temperatures at the study site



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Fig. 5. Number of trees flowering (- - -) and fruiting, partitioned by seed dispersal syndrome as defined in Hamann & Curio (1999). From top to bottom: bird dispersed (□), dispersed by gravity or unknown vector (■), wind dispersed (□), fruit bat dispersed (□), dispersed by other mammals (□).

A. Hamann

Table 1 Principal component analysis of the annual deviation in flowering and fruiting date from the 4-year average

Variable	Eigenvectors	
	PC1	PC2
Flowering		
1996	-0.35	0.01
1997	-0.31	0.36
1998	0.87	0.27
1999	0.08	-0.77
Fruiting		
1996	-0.22	0.21
1997	-0.23	0.34
1998	0.88	-0.09
1999	-0.35	-0.78

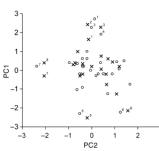


Fig. 6 Plot of the first two principal components for annual deviation in the date of flowering (x) and fruiting (o). Numbers identify the tree species mainly responsible for the effect and discussed in the text.

year, and *Elaeocarpus cumingii* Turcz. (Details of all species are given in Appendix S1, see Supplementary

The weather patterns following the La Niña anomaly in 1999 generally had a smaller effect on the date of flowering and fruiting. Weinmania cantigutinensis Elm. (Fig. 6 species 7, also Fig. 7d) and Symplocus ophirensis (Lour.) Moore (species 8) were the only species that had pronounced delays in phenology. Elaeocarpus cumingii did not flower, Palaquium hizoniensis (Fig. 7e) lacked the April fruiting peak, and many understorey trees that had continuous flowering patterns generally showed reduced activity during the La Niña event (data not shown).

The three dipterocarps Parashorea malaamoan (Blco.) Merr. (Fig. 7f), Smora polysperma (Blco.) Merr. (Fig. 7g) and Shorea almon Foxw. were the only species with supra-annual patterns. In all cases one minor fruiting event was followed by a mast-fruiting during the subsequent year.

#### Discussion

#### ULTIMATE CAUSES

The observed tree species exhibited a wide variety of phenological behaviour. This is not surprising as phenological patterns potentially integrate a large number of selective forces caused by climatic factors as well as biotic factors such as escape from pests or optimization of pollination and seed dispersal. Nonetheless, the data indicate that seasonality in climatic factors plays a major role in shaping broad community-wide phenology patterns. There is, for example, an obvious selective advantage for wind-dispersed species to fruit during the windiest time of the year, and all wind-dispersed trees fruited during the typhoon season between July

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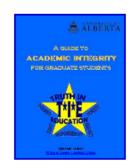
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# **Project Presentations**

# 5 min, Ignite style