

Taiwan Forest Dynamics Network

2012 ~ 2013

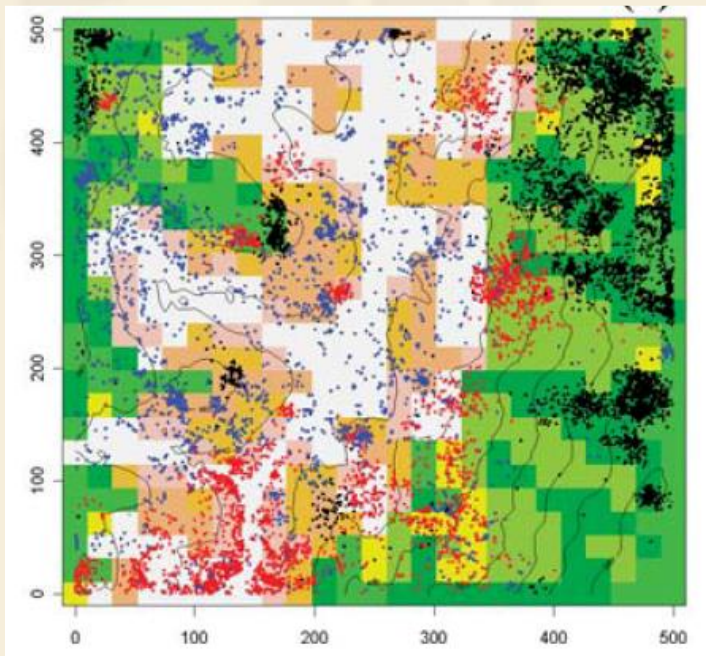


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CTFS: network connected by unified methodology



Species coexistence



Gunatilleke et. al. 2006

- ❖ Why are there so many species in tropical forests?

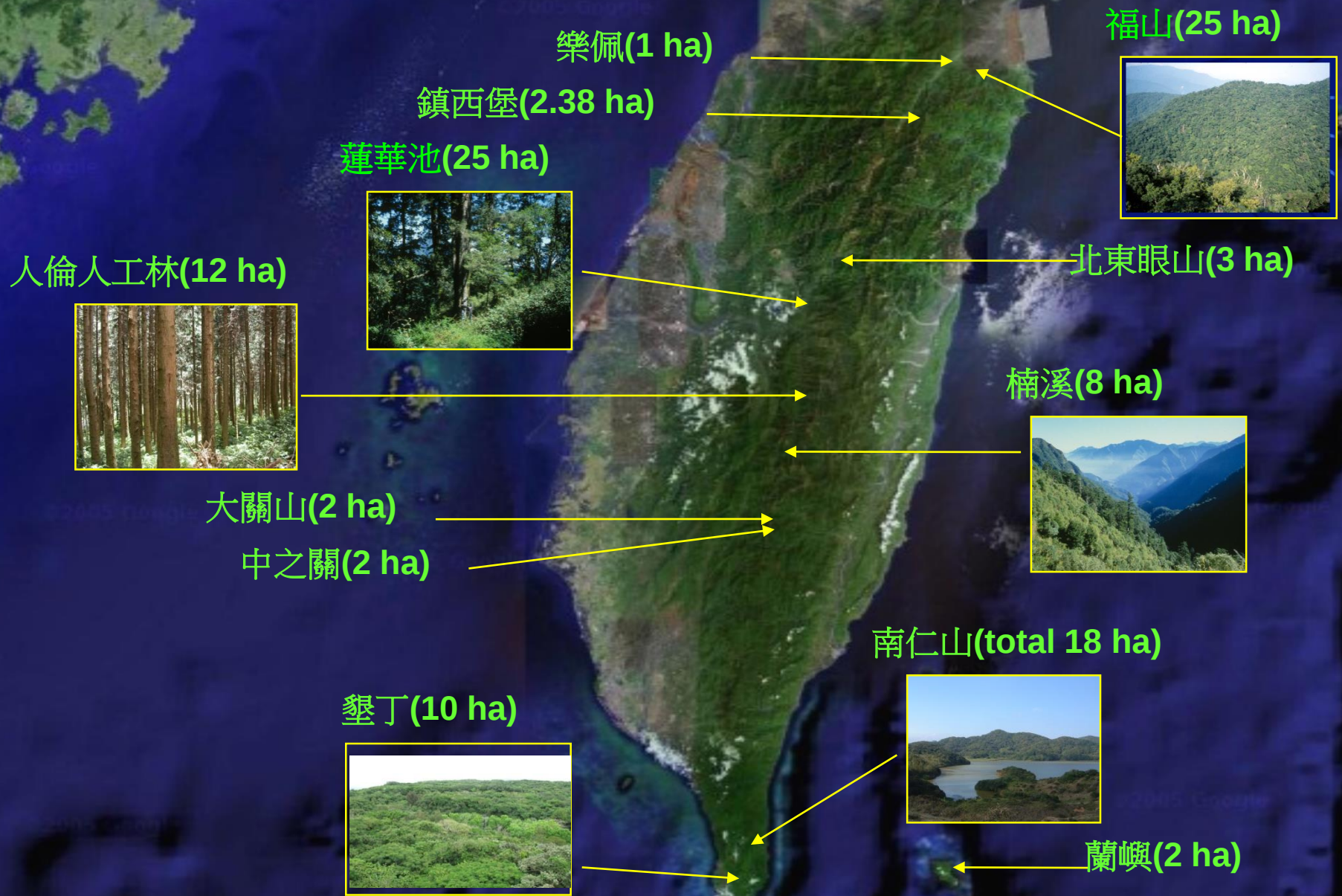
Forest dynamics

Spatially-explicit

Cross multiple life stages

Seeds, seedlings, adult trees

Taiwan Forest Dynamics Network



Research Team



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蘇聲欣



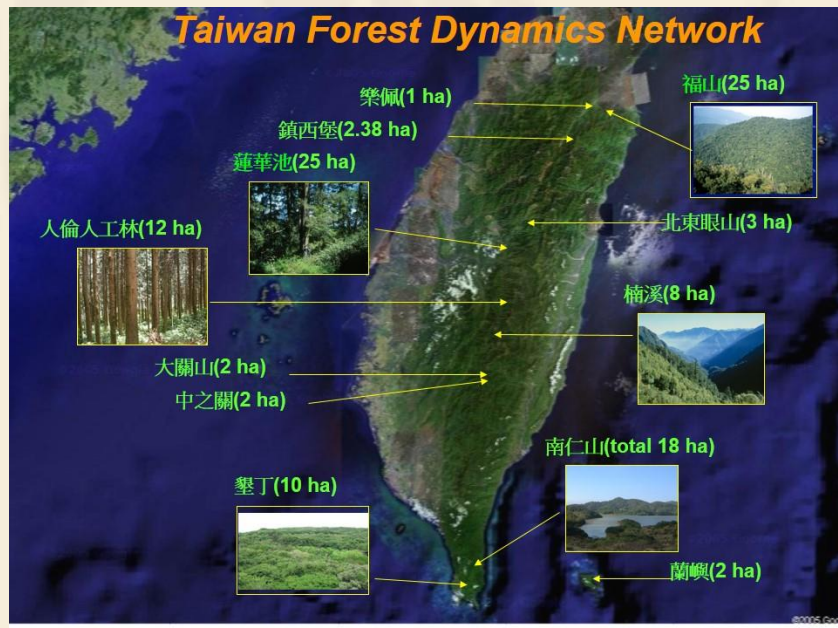
張勵婉



伍淑惠



Tree census

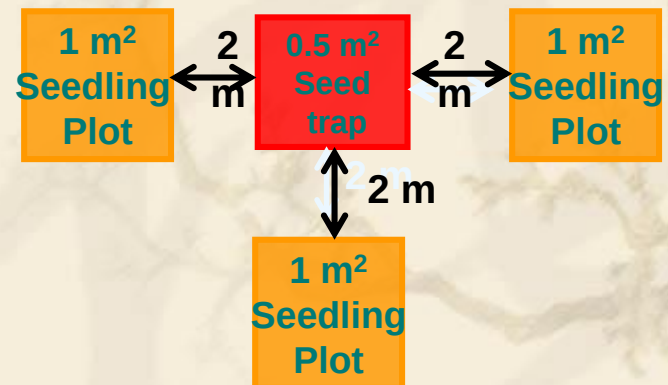


- ❖ DBH greater than 1 cm
Tagged and mapped
- ❖ Every five years
Fushan 2003, 2008, 2013
LHC 2008, 2013
Kenting 2002, 2008, 2013

Seed traps and seedling plots



- ❖ Seed traps
Weekly collection
- ❖ Seedling census
3 or 6 months
- ❖ Fushan (2002) Kenting (2006)
LHC (2008) Zenlun (2006)



Taiwan Forest Dynamics Network Publications (2012~2013)

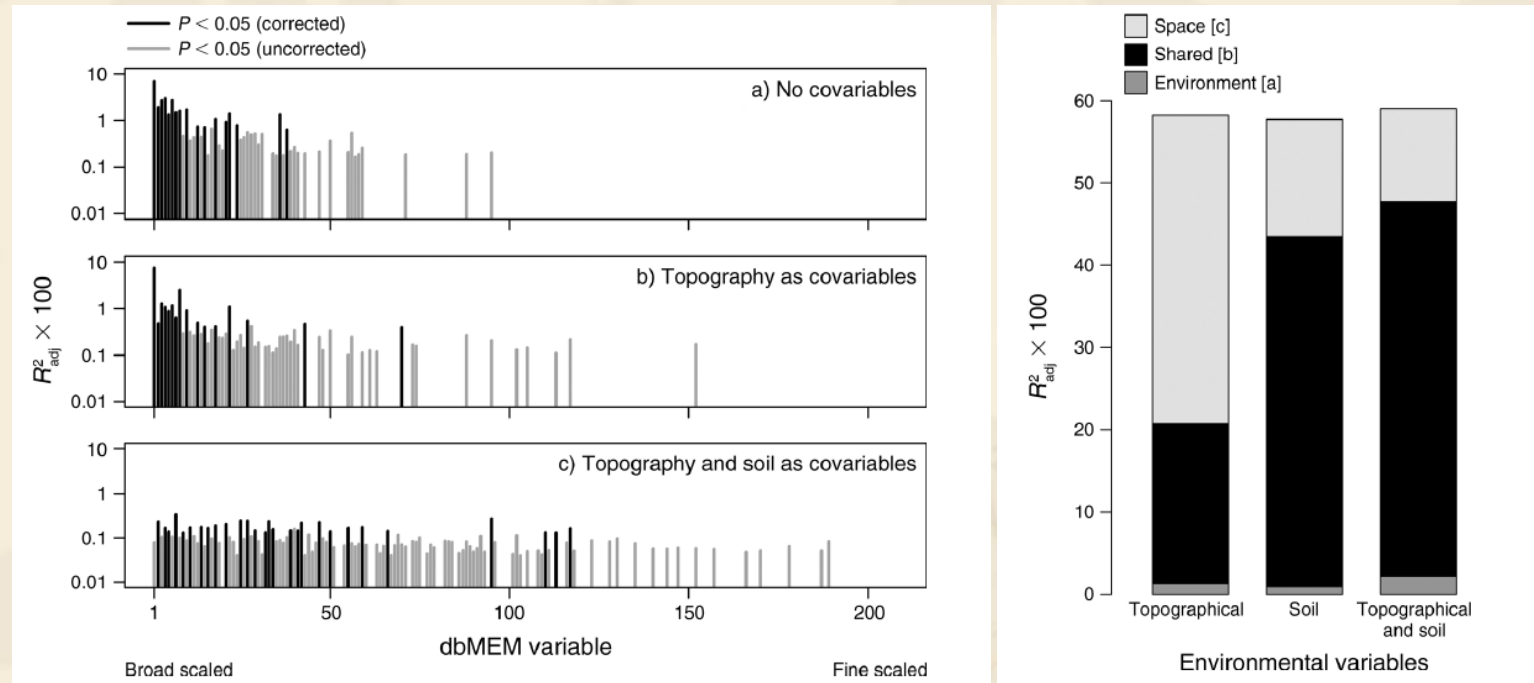
- ❖ Chang, L.-W., Zeleny, D., Li, C.-F., Chiu, S.-T., Hsieh, and C.-F. 2013. Better environmental data may reverse conclusions about niche- and dispersal-based processes in community assembly. 2013. *Ecology*, in press.
- ❖ Lasky, J. R., Sun, I-F., Su, S-H., Chen, Z-S. and Keitt, T. H. 2013. Trait-mediated effects of environmental filtering on tree community dynamics. *Journal of Ecology* 101: 722-733.
- ❖ Chang-Yang, C-H., Lu, C-L., Sun, I-F. and Hsieh, C-F. 2013. Flowering and fruiting patterns in a subtropical rain forest, Taiwan. *Biotropica* 45: 165–174.
- ❖ Chang-Yang, C-H., Lu, C-L., Sun, I-F. and Hsieh, C-F. 2013. Long-term seedling dynamics of tree species in a subtropical rain forest, Taiwan. *Taiwania* 58: 35-43.
- ❖ Liu, T-H, Lin, Y.-C., Wei, C.-H. and Su, H.-H. 2012. Seed distributions and density of *Bischofia javanica* produced by Taiwanese macaques (*Macaca cyclopis*) in Kenting. *Tunghai Science* 14: 46-65 (In Chinese).
- ❖ 與中國大陸森林動態樣區合作發表之論文
- ❖ Lai, J., Coomes, D.A, Du, X., Hsieh, C-F., Sun, I-F., Chao, W-C., Mi, X., Ren, H., Wang, X., Hao Z., and Ma, K. 2013. A general combined model to describe tree-diameter distributions within subtropical and temperate forest communities. *Oikos*

Taiwan Forest Dynamics Network Publications (2012~2013)

- ❖ Shealn, G., He, F., Waagepetersen, R., Sun, I-F., Hao, Z., Chen, Z-S. and Yu, M. 2013. Quantifying effects of habitat heterogeneity and other clustering processes on spatial distributions of tree species. *Ecology*.
- ❖ 與國際森林動態樣區合作發表之論文
- ❖ Chisholm, R.A., Muller-Landau, H.C., Rahman, A., Bebber. D.P., Bin, Y, Bohlman, S.A., Bourg, *et al.* 2013. Scale-dependent relationships between tree species richness and ecosystem function in forests. *Journal of Ecology* online early.
- ❖ Brown, C., Burslem, D. F. R. P., Illian, J. B., Bao, L ., Brockelman, W., Cao, M., Chang, L. W., Dattaraja, H. S., *et al.* 2013. Multispecies coexistence of trees in tropical forests: spatial signals of topographic niche differentiation increase with environmental heterogeneity. *Proceedings of the Royal Society B: Biological Sciences* 280: 20130502.
- ❖ De Cáceres, M., Legendre, P., Valencia, R., Cao, M., Chang, L-W., Chuyong, G., Condit, R., Hao, Z., Hsieh, C-F., Hubbell, S., Kenfack, D., Ma, K., Mi, X., Supardi N., Kassim, A. R., Ren, H., Su, S-H., Sun, I-F., Thomas, D., Ye W., and He, F. 2012. The variation of tree beta diversity across a global network of forest plots. *Global Ecology and Biogeography* 21: 1191-1201.

Explaining spatial variability in species composition

❖ Variation partitioning

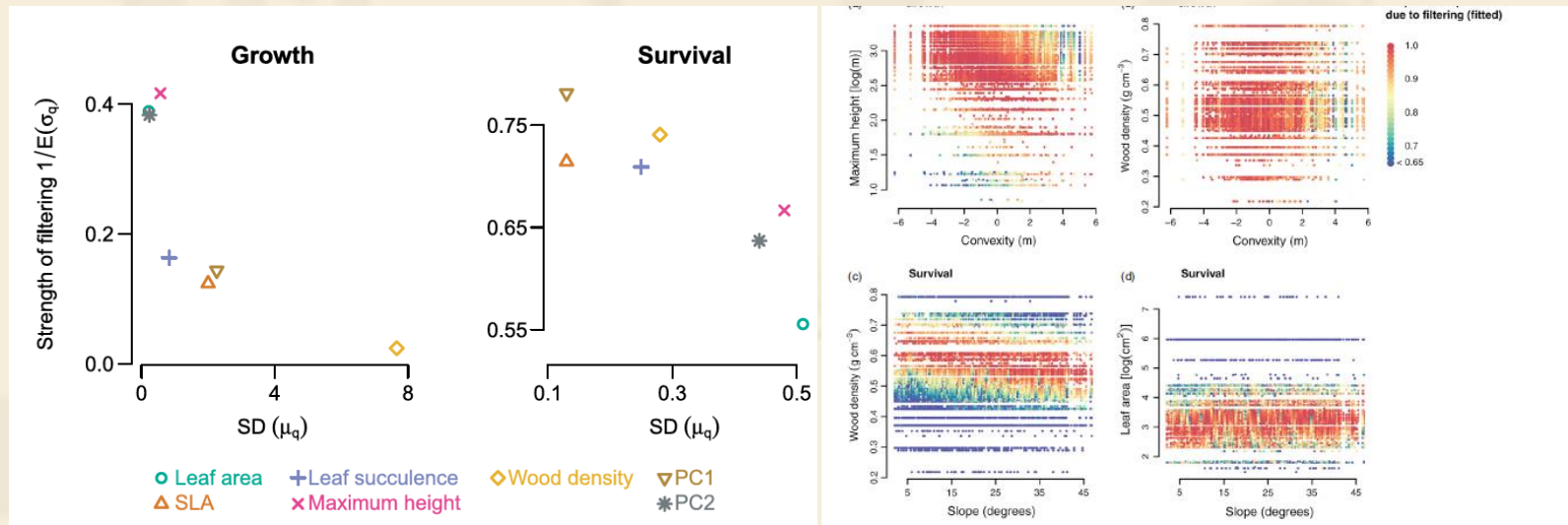


Chang, L.-W., Zeleny, D., Li, C.-F., Chiu, S.-T., Hsieh, and C.-F. 2013. Better environmental data may reverse conclusions about niche- and dispersal-based processes in community assembly. 2013. Ecology, in press.

Evaluating effects of habitat filtering on tree survival and growth

❖ Hierarchical Bayesian model

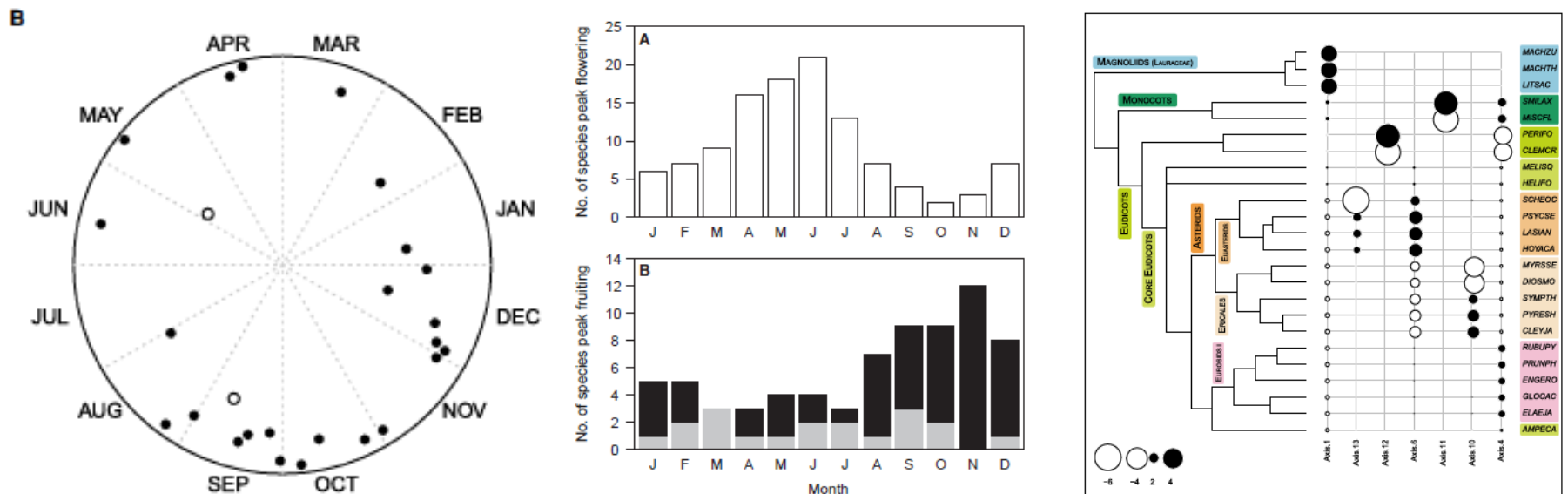
$$S_t = S_s + \delta_t + F_{sq}$$



Lasky, J. R., Sun, I-F., Su, S-H., Chen, Z-S. and Keitt, T. H. 2013. Trait-mediated effects of environmental filtering on tree community dynamics. *Journal of Ecology* 101: 722-733.

Phenology

- ❖ Evaluating the relative importance of abiotic/biotic factors and phylogenetic constraints



Chang-Yang, C-H., Lu, C-L., Sun, I-F. and Hsieh, C-F. 2013. Flowering and fruiting patterns in a subtropical rain forest, Taiwan. *Biotropica* 45: 165–174

Summary and future direction



- ❖ **Habitat heterogeneity**
- ❖ **Seasonality**
- ❖ **Functional traits**
- ❖ **Expanding phenology study**
- ❖ **Latitudinal gradient**
- ❖ **Productivity – functional diversity**
- ❖ **Seedling dynamics**

Grants

❖ 2010/08–2013/07 基於網路的森林生物多樣性維持
機制緯向梯度研究

計畫主持人：孫義方老師

NT \$ 4,985,184元 國家科學基金會



Workshops

- ❖ **Phylogenetic and Functional Trait analyses of Communities Workshop (2012.5.7~5.16)**
- ❖ **Workshop in Behavior Ecology and Plant-Animal Interactions (2012.6.2~6.3)**
- ❖ **Workshop in Experimental Design & Workshop in Ecological Statistical Modeling (2012.6.13~6.22)**

~~ Sponsored by Dong Hwa University, but 10 participants from China

Thank you for your attention

