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Front Cover: Red mangrove, *Rhizophora mangle*, is one of the dominant species in the mangrove community in South Florida. Photo: Sara Edelman

Back Cover: *Hedera helix* is a potential invasive threat at the UBC Botanical Garden. Photo: Daniel Mosquin

Table of contents

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Editorial

Wanted – taxonomists to identify our flora

The publication of the paper by Edelman and Griffith in this issue is coincidentally linked to the recent very active communication among members of the British Columbia Association of Professional Biologists concerning invasive plants in BC. The paper reports the local history around the Montgomery Botanical Center (MBC) in Coral Gables Florida and its records of invasion by a Brazilian species (*Schinus terebinthefolia*) that has proved very successful in Florida mangrove habitat. The paper is remarkable because MBC has records that provide visible evidence of changes that have occurred as this 'invasive species' moved into its new habitat. Every undergraduate student, and probably any student who has a basic interest in natural history, knows that invasive plants tend to take over a new space and that the out-competed species become threatened species and seem to take their co-occupants out of the ecosystem in question

A visitor to the UBC Botanical Garden cannot miss three infamous invasives, *Hedera helix* (English ivy - Image: Back Cover), *Rubus armeniacus* (Himalayan blackberry), and *Geranium robertianum* (herb robert). In summer as the visitor approaches the Garden, they drive/walk/cycle past *Lythrum salicaria* (purple loosestrife) flowering profusely in the roadside ditches. These and many other invasives were introduced with horticultural intentions to provide ground cover, tasty fruit or beautiful flowers.

What can we do? The answer probably is that there may be local actions, but invasives are what they are because of their opportunism in new surroundings. A citizen group has been working over the last few years to remove English ivy that has escaped into the Pacific Spirit Regional Park, which borders on the UBC Garden. The project has certainly had partial success, but individuals who dream of eliminating invasives probably should understand that the best we can hope for is some level of control. Biological control has considerable merit, but it seems that invasives and other pest and disease organisms can and do evolve to accommodate themselves to the control agent. Better understanding of biology can help but it is increasingly apparent that we do not understand much about these organisms. They, like humans are ever willing and able to exploit new biological opportunities.

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Simplicity may be a good start. For example, if flowers are removed before seed set, there may be some hope, but the big problem seems to be that we no longer have that cadre of professional and amateur naturalists who can actually identify organisms. These are the taxonomists, truly one of the seriously endangered scientific species. There may be economic and political actions that will help, but if we cannot identify organisms properly then invasives will arrive without a visa and be admitted without any identification. BC has few taxonomist experts, and many of those are seeking more acceptable research work to ensure that they can fund the research that they need to do to endure their professional survival. Maybe it is time to recruit amateur naturalists to lead the drive to fill the void created by both academia and bureaucracies that have sometimes actively discouraged the essential public service of identifying the members of the living world.

Mangrove and Brazilian pepper in the garden:

A case study of vegetation change over 80 years.

ABSTRACT:

Brazilian pepper (*Schinus terebinthefolia*) is an aggressive exotic shrub in South Florida, which invades disturbed areas and often creates dense monocultures. As part of management efforts at Montgomery Botanical Center, we investigated a disturbed habitat with both *Schinus terebinthefolia* and native mangrove vegetation, on a 12 hectare landsite that was initially cleared and has been left fallow since at least the 1950s. We examined relative density and spatial distribution of mangrove and *S. terebinthefolia*, in order to explore hypotheses about competition between mangroves and *S. terebinthefolia*. We reviewed archived aerial photographs and conducted a targeted field survey of the interface between the mangrove and Brazilian pepper. Results of the survey and modeling demonstrate that mangroves may sometimes compete successfully with *S. terebinthefolia*. Intermediate age *S. terebinthefolia* were not observed at any transect point and seedlings did not produce typical allelopathic effects. In this case mangrove vegetation may compete when dispersed into open areas proximal to *Schinus* stands. Areas first colonized by mangrove did not support recruitment of *Schinus* and dense monospecific stands of *S. terebinthefolia* did not support further seedling recruitment of that species. This may be due to the specific hydrolic conditions and soil dynamics observed in this area. Marl soil, low elevation and constant flux in water level hindered the ability of *Schinus* to dominate the entire area of the study. Our observations are consistent with observations that early phases of mangrove restoration work are critical to establishing healthy mangrove systems, which are less likely to be invaded by *Schinus* as mature stands.

Keywords: *Schinus terebinthefolia*, Brazilian pepper, Mangrove, invasive species, competition, exotic plant dominance.

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INTRODUCTION:

Schinus terebinthefolia, commonly known as Brazilian pepper or Florida Holly (Figure 1), is an aggressively invasive exotic shrub in South Florida (Cuda et al., 2006). Initially introduced as an ornamental from Brazil, Paraguay and Argentina, *S. terebinthefolia* commonly invades disturbed habitats in South Florida by outcompeting native vegetation (Williams et al., 2005). It creates a dense monoculture by forming a thick mid-story and canopy, shading out competing plants (Jones and Doren, 1997; Cuda et al., 2006). One way *S. terebinthefolia* suppresses competition is through allelopathy. It releases a toxic chemical from its fruit. The chemical disperses, spreading through soil with good drainage and inhibiting germination of other species (Inderjit and Callaway, 2003; Morgan and Overholt, 2005). *S. terebinthefolia* has a high seedling

Image: Sara Edelman

Figure 1. Brazilian Pepper, *Schinus terebinthefolia*, was once widely cultivated for its attractive red fruits, which are present around the holiday season (cf. Florida Holly). It is now considered an invasive exotic, and is on the prohibited list for Miami-Dade County.

survivorship when invading a new area, which can surpass 90%. Many native Florida habitats such as hammocks, mangroves and pinelands have been invaded by this species. Currently, more than 283,000 hectares are infested with *S. terebinthefolia* (Hall, 2003) and it is considered one of the most destructive and extensive non-indigenous exotic pest plants.

Mangrove forests (Figure 2, front cover) are a native habitat along the South Florida coast, from St. Augustine on the eastern coast southward and from Cedar Key on the western coast southward (Figure 3). Mangroves are commonly found in estuaries and offshore islands where saltwater mixes with freshwater (Kjerfve, 1990). Four distinct tree species comprise the mangrove forest community in Florida: *Rhizophora mangle* L. (red mangrove), *Avicennia germinans* (black mangrove), *Laguncularia racemosa* (white mangrove) and *Conocarpus erectus* L. (buttonwood) (Chapman, 1976). Mangrove communities survive on the bays and coasts because they can obtain freshwater from saltwater (Twilley & Chen, 1998). They support a wide range of flora and fauna. Man-made disturbances coupled with the introduction of *S. terebinthefolia* has resulted in *S. terebinthefolia* dominance in some native mangrove communities (Alexander and Crook, 1973).

Montgomery Botanical Center (MBC) is a botanic garden in Coral Gables, Florida, focused on research and conservation collections. Twelve hectares on the southeast quadrant of the property were cleared for farming prior to 1960, and have been left fallow since at least the 1950s. This fallow land, along with other land, became the property of MBC in 1960. The north and west sides of this fallow area are bordered by garden areas. The south side is adjacent to a school, and the east side is bordered by the Hardy Matheson Preserve, which contains healthy mangrove forests. The 12 hectares of fallow land currently have both mangrove and Brazilian pepper stands.

Planning for long term landscape management at MBC prompted a thorough look at this portion of the landsite and included a vegetation study. In addition to land management information, we took the opportunity to examine the relationship between mangroves and *S. terebinthefolia* in an area where both had been given equal opportunity to recruit. We examined historical data sources and the current vegetation to identify trends such as relative percentage cover over time to see if these data could inform whether mangroves could compete with *S. terebinthefolia* in a disturbed area of former mangrove habitat.

MATERIALS AND METHODS:

Study Site: The study took place on 12 hectares of the southeast quadrant of Montgomery Botanical Center, Coral Gables, Florida. The area has an elevation from 0-2 m, and the natural soil profile was modified by the pre-garden (pre-1960) owners. The soil is marl type, and furrows were installed for broccoli agriculture. The furrows are approximate one metre wide and one metre deep. The distance between each furrow is approximately 3 metres. Due to the furrows' connectivity to the bay, the changing tides directly change the water levels throughout the site. In general, the land site slopes from the west to near sea level in the east. Therefore, the change in water level is more drastic in the eastern side.

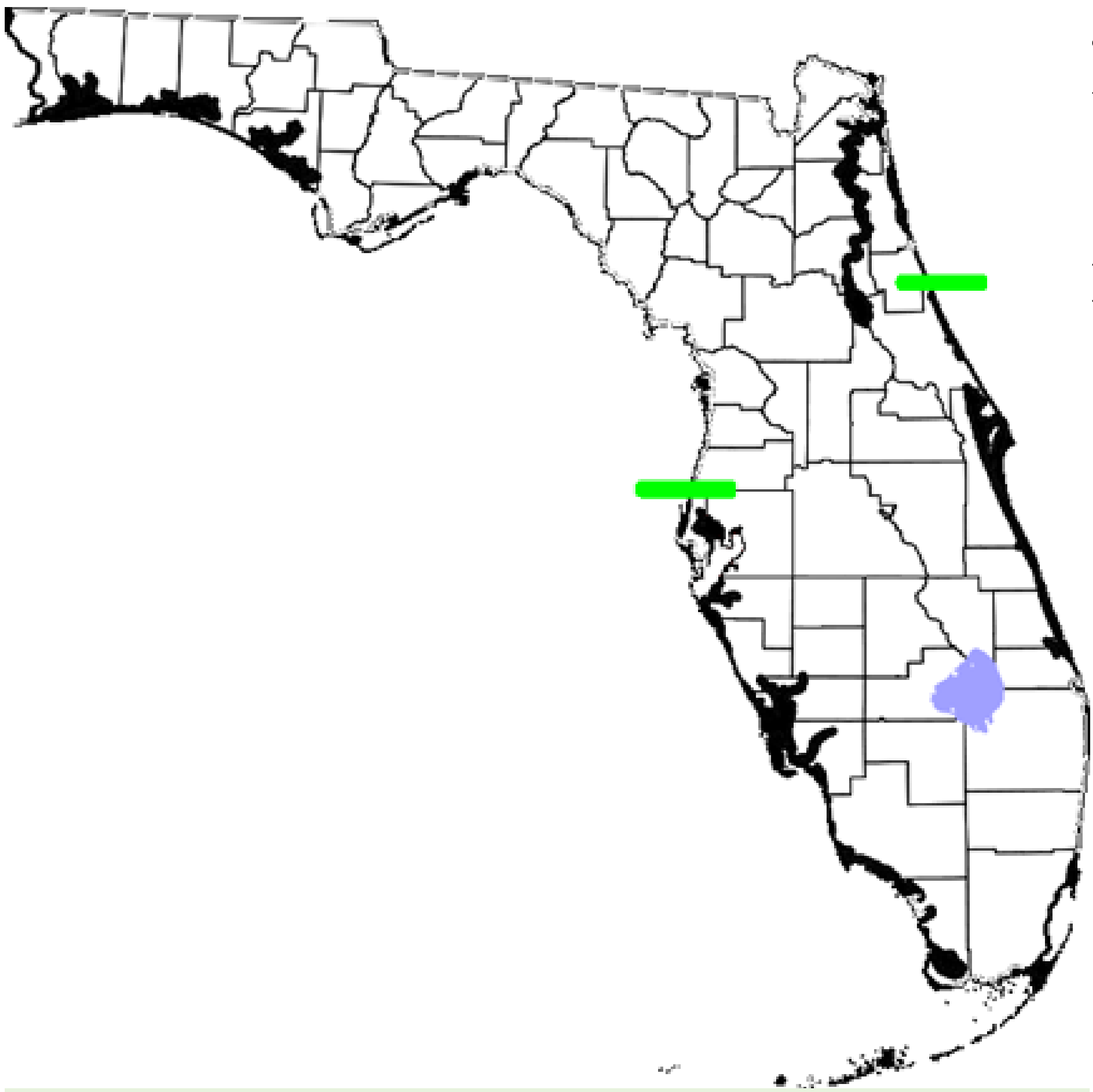


Image: Adapted from Lockhart et al. (1996).

Figure 3. Distribution and extent of mangrove species along the coastline of Florida. The green line segments indicate the northern limit of observed mangrove communities on the west and east coasts of the Florida peninsula. Some disjunctions have been reported north of the west coast extent shown here.

Review of Historical Data: A time series of aerial photographs that were available in the Montgomery Archive were studied to identify changes in vegetation between the 1920s and the present.

Vegetation characterization: Surveys of current vegetation were completed in January and February 2010. Relative percent cover of mangrove and *Schinus* was determined around twenty four random points along the eastern side of the site. Two 10 metre transect lines started at each point., one line extended to the north of each point, and one line extended to the west. At 1 m intervals along each transect line, we noted species present in the ground cover, mid story and canopy, paying special attention to *S. terebinthifolia*. Percentage of *S. terebinthefolia* cover was recorded for each transect interval based on the percentage of *S. terebinthefolia* present in the canopy. Using percentage of *S. terebinthefolia* at each interval, we found the percentage of *S. terebinthifolia* at each transect line. These data were mapped using Arc GIS (ESRI, 2009) to spatially characterize the relative percent cover.

RESULTS AND DISCUSSION:

Historical Condition: Figure 4 shows the landsite in 1928 before clearing. This is the earliest known aerial photo of the site. Archival records refer to farming on the site before the acquisition of the property in 1960 and to fallow land after around 1950. Records of management exist for the 50 years since the land was purchased on behalf of Montgomery Botanical Center in 1960 (Figure 5). Based on serial comparison of the aerial imagery, during the fallow period from circa 1950-present, increasing relative density and relative area of mangrove occurred in the east and increasing relative density and relative area of *S. terebinthefolia* in the west (Figures 5-8). This is consistent with what is known about minor elevation considerations for mangrove recruitment (Kitaya et al, 2002; Ohimain et al, 2010), as the western edge of the landsite is higher than the eastern edge. A general observation is that *S. terebinthefolia* recruited at a faster rate and spread more quickly than the mangrove species. Area of *S. terebinthefolia* was measured from the aerial photographs by estimation using the dimensions of the furrows.

The 1928 aerial photograph (Figure 4) shows the surrounding area's natural vegetation. Mangrove vegetation runs along the coast and westward until it encounters the limestone ridge that runs through the Montgomery property. Mangroves do not expand past this point due to elevation changes that make the area unsuitable for their growth (Kitaya, et al. 2002).

Subsequent aerial photos were taken after the Montgomery Foundation purchased the property in 1960. Relatively little mangrove vegetation growth on the east and *Schinus* growth on the west is observed in the 1962 aerial photo (Figure 5). A system of furrows and ridges remaining from agricultural development appear on the landsite. These are especially prominent in Figure 5, and run throughout the twelve hectares. The drainage furrow system is still present, and mangroves are most prevalent along the edges of the furrow system. The single east to west furrow is connected to seven north to south furrows. These furrows do not see very active tidal flow, but are wetter than the adjacent land. Individual trees of both *Schinus* and mangroves can be identified in Figure 5.

Mangrove regrowth on the eastern side of the site was visible in 1975 and *S. teribinthefolia* growth expanded between 1968 and 1975 (aerial photographs in the Montgomery Archive, not shown), and increased in relative density. *S. terebinthefolia* completely dominated the canopy in the southwest corner of the site in 1975, while the mangroves in the southeast corner were more robust but had not spread as far. By 1987 (Figure 6) mangroves dominated the eastern side and most of the old furrow system, except for the westernmost side. *Schinus* has expanded in between the mangrove dominated furrows.

By 1998 (Figure 7), the fallow land was entirely revegetated by mangrove and *Schinus*, and canopy cover was near 100% in most areas of the site. Figure 7 also shows a

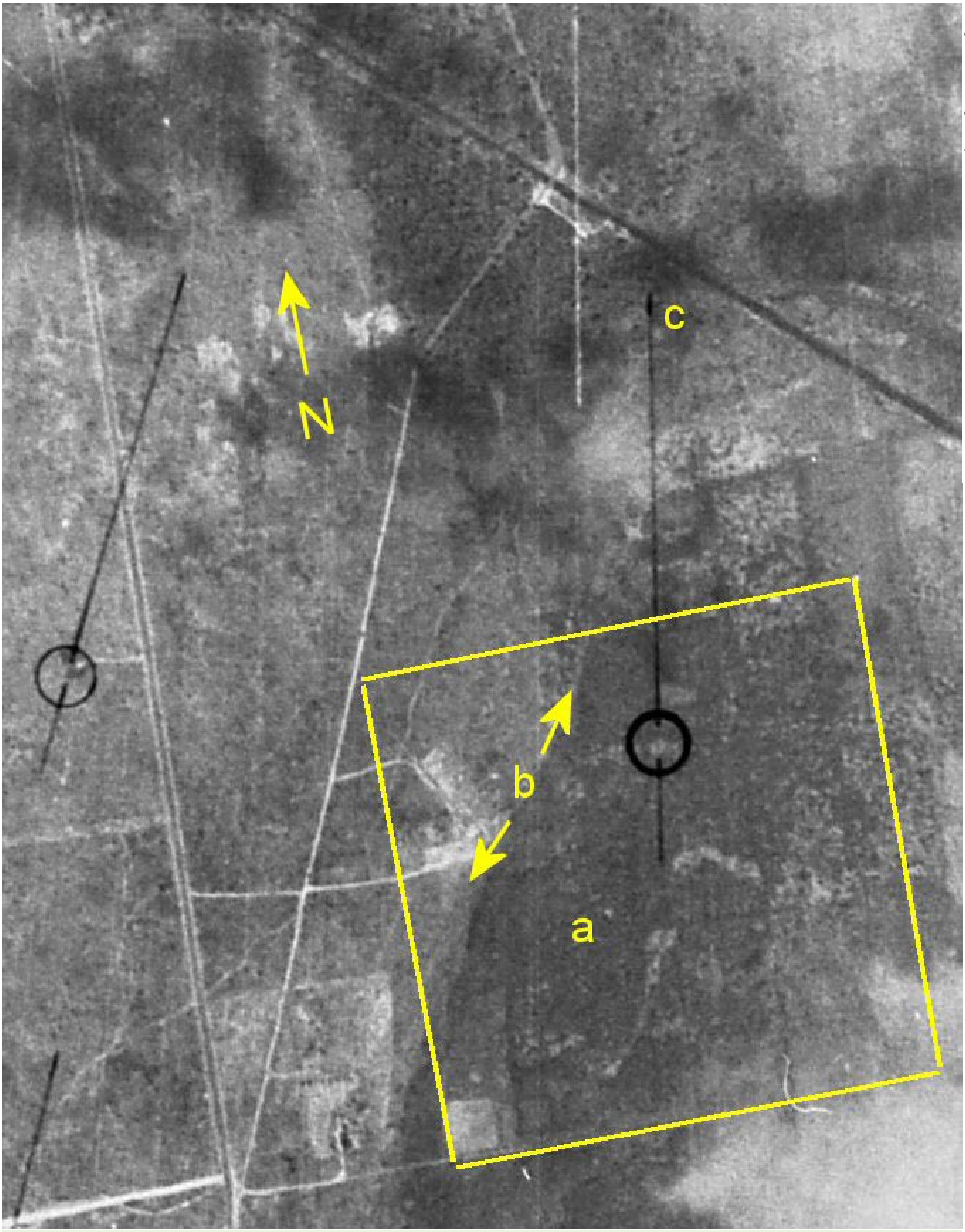


Image: The Montgomery Archive

Figure 4. 1928 Aerial Photo. The area of interest is included within the yellow outline. This photo shows natural vegetation prior to the establishment of the first botanic gardens in the area (beginning in 1932). Mangrove hammock (a) was the natural vegetation of this area from the bay to the ridge (b), which is clearly defined in this photo. The diagonal line in the upper right (c) is Snapper Creek.

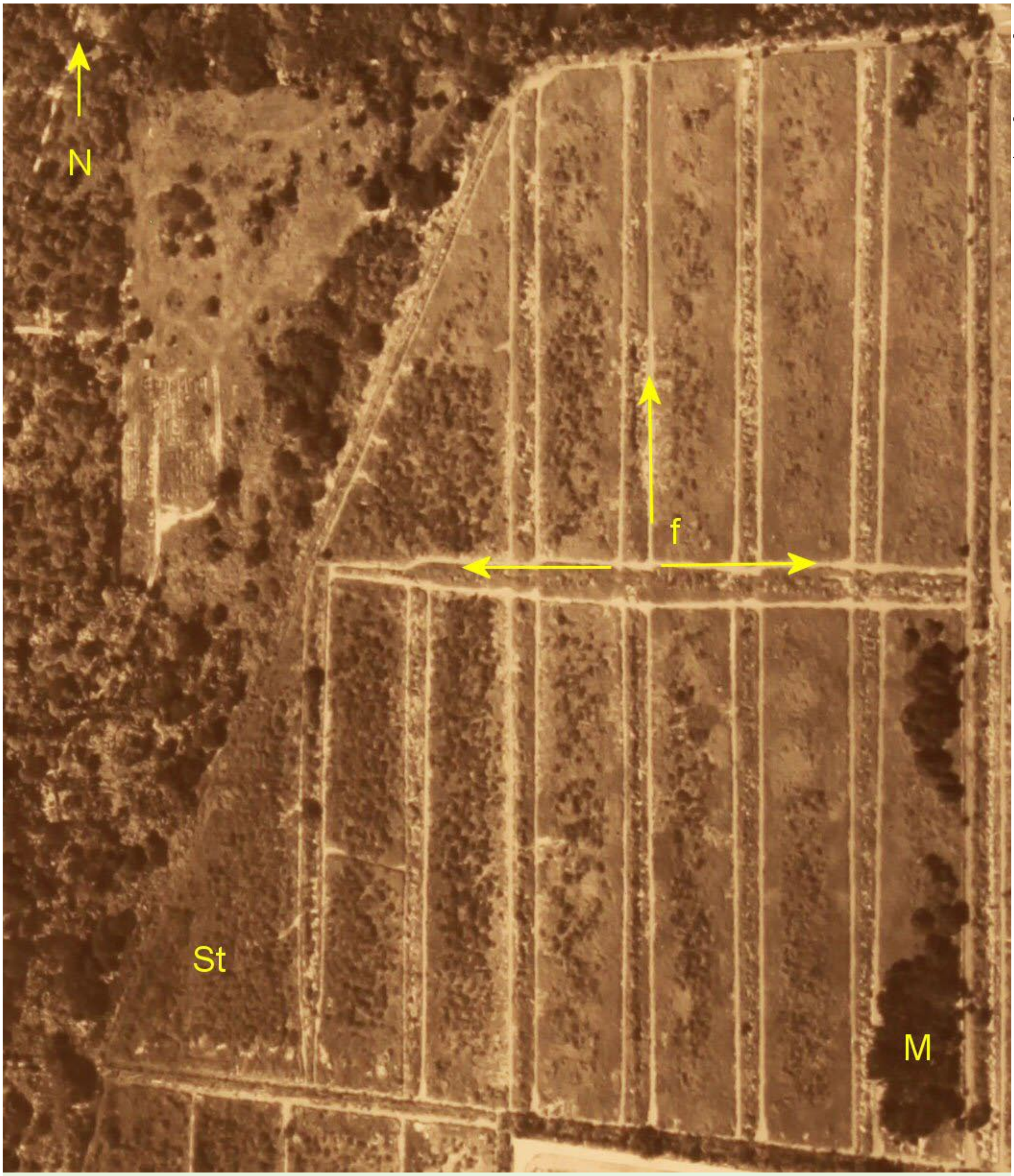


Image: The Montgomery Archive

Figure 5. 1962 Aerial Photo. This photograph shows *S. terebinthefolia* growth on the western side of the fallow area (St) and virtually no growth on the eastern side, save for a few mangrove trees (M). A network of furrows (f) were installed prior to 1960 to drain the area of water for agriculture. These furrows are still visible.

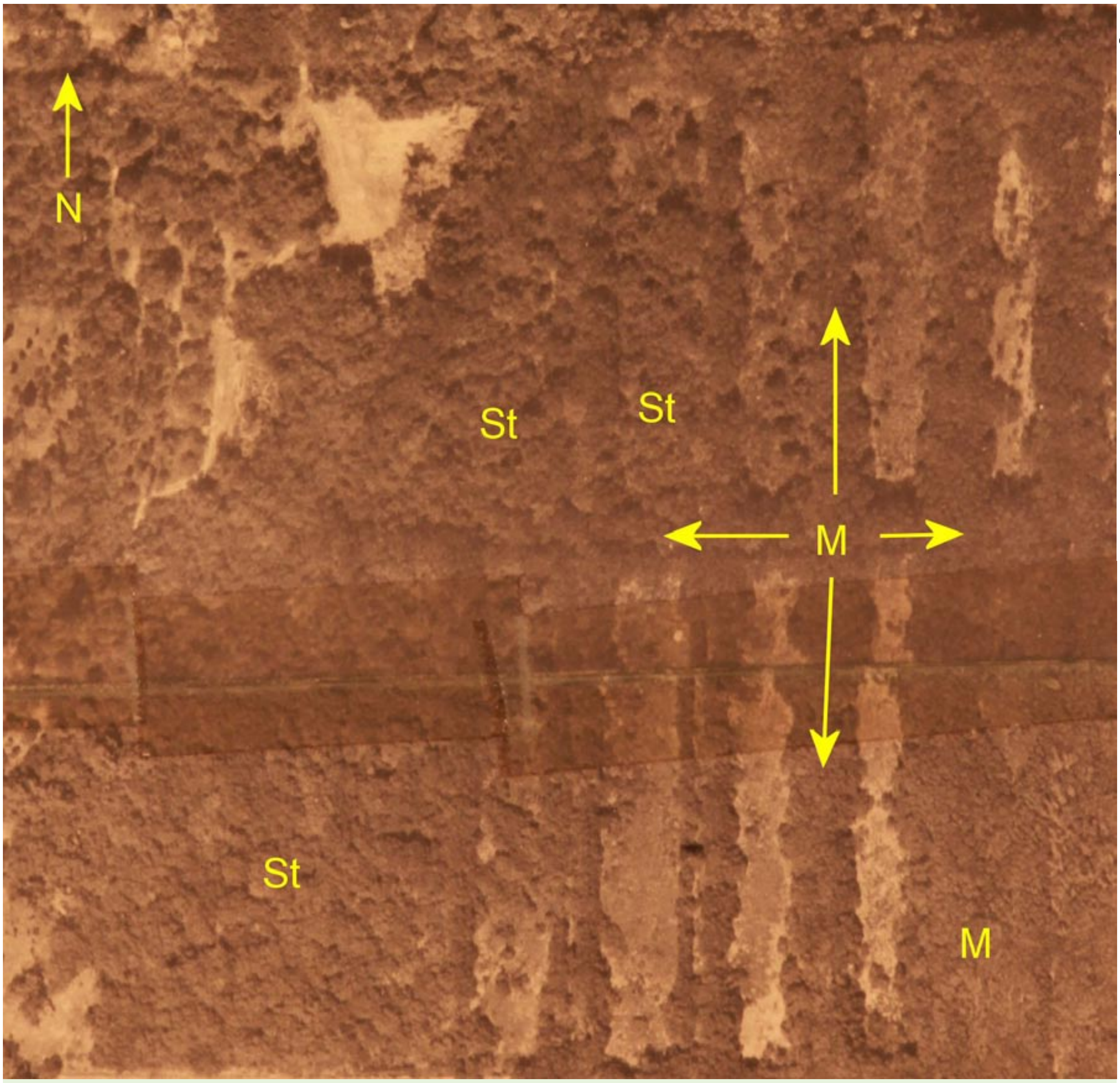


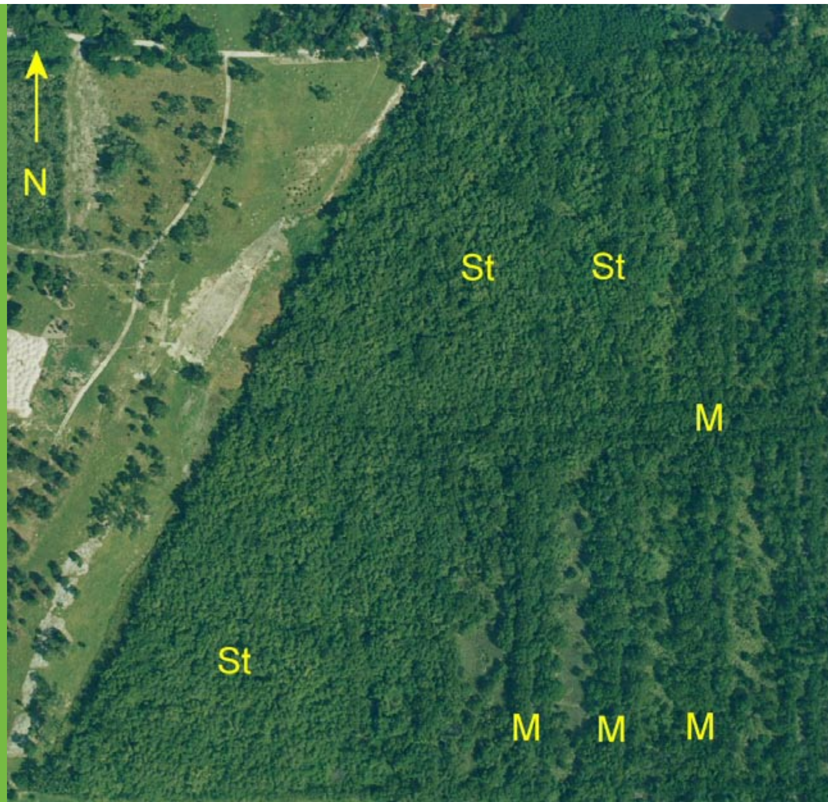
Image: The Montgomery Archive

Figure 6. 1987 Aerial Photo. *Schinus* (St) completely dominate western side and spaces between furrows. Mangroves (M) dominate the eastern portion and furrows. The mangrove preserve that borders the bay connects with the mangrove community on the property and act as a seed source.

particularly clear differentiation of texture between the *Schinus* and mangroves. Aerial photos from 2003 through 2006 were also examined and virtually no change in percent cover occurs until 2008 when the MBC team began clearing a portion of the densest *Schinus* stand in the southwest corner of the twelve hectares (Figure 8).

The general change over time could thus be described as a spread of two communities on the cleared site over 50 years. The monospecific community of *Schinus* trees expanded from the western edge of the site, and achieved a very high density early on, eventually creating complete canopy cover in the southwestern portion. The mangrove community spread from the eastern edge, at a slower rate, and achieved a less dense canopy during the same time period.

Current Vegetation and Recruitment Characterization: The results of the current vegetation survey are presented in Table 1 and Figure 9. The



Images: The Montgomery Archive

Figure 7. 1998 Aerial Photo. *Schinus* (St) fill in most empty spaces and the once fallow land is almost entirely vegetated by *Schinus* or mangrove (M) species.

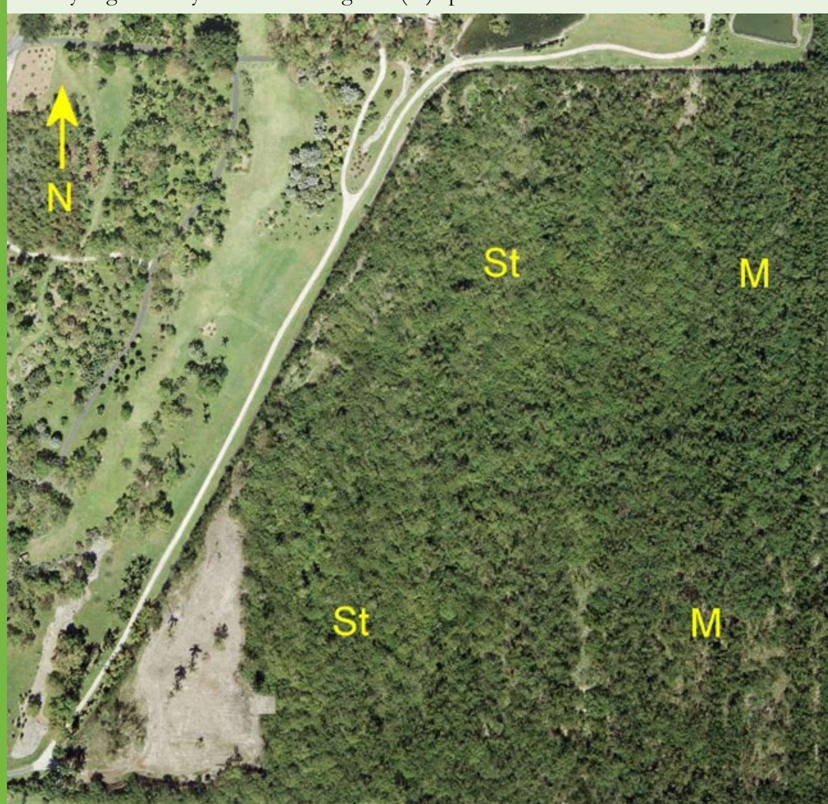


Figure 8. 2008 Aerial Photo. This is the most recent photo taken. Approximately 0.8 hectares of 100% *S. terebinthefolia* was cleared (a) as part of management efforts. The eastern area remains dominated by *Schinus* (St), and the western area is now dense mangrove (M).

western portion of the twelve hectares is mostly dominated by *S. terebinthefolia*. The eastern portion is mostly dominated by mangrove. This is consistent with the aerial photo time series described above.

Mangroves, and *Rhizophora mangle* in particular, were the observed dominant vegetation in the furrows. *Rhizophora* are adapted to lower elevation, brackish water and changes in water level (Kjerfve, 1990; Kitaya, 2002; Ohimain, 2010). Canopy stratification was observed where mangroves and *Schinus* occurred together. Mangroves dominated the upper canopy and *Schinus* dominated the lower canopy. Some mangroves were observed in *Schinus* dominated areas as well. These varied in size and most were not robust trees, probably due to minimal access to sunlight. Recently cleared areas show some significant recruitment by native mangrove seedlings in some areas. These were very new seedlings still exhibiting cotyledons in February 2010 (Figure 10).

Seedlings of *Schinus* were observed in newly cleared areas and alongside mangrove vegetation. No seedling observed was larger than 3-5 cm. No *Schinus* saplings were observed in the entire twelve hectare study area. In the densest area of *S. terebinthefolia*, no intermediate age trees and few seedlings were observed. The densest areas of *S. terebinthefolia* consisted of a bare understory (bare soil), a thicket of dead branches in the mid-story, and a dense canopy of *Schinus*, creating dense shade. In general, as *Schinus* density increased, species richness decreased.

In the few areas within the study site that were not yet closed-canopy (the southeastern corner) there were no observed *S. terebinthefolia* seedlings or saplings. Where there were *S. terebinthefolia* seedlings, other vegetation was observed beside them. It seems that we did not observe the reported allelopathic effects of *S. terebinthefolia* seedlings. In this cases toxins usually released by *S. terebinthefolia* seedlings were either not released or were unable to spread to inhibit growth of other vegetation. The lack of *S. terebinthefolia* saplings suggests a low seedling survivorship rate. Usually, *S. terebinthefolia* seedling survivorship rate in a disturbed area can range up to 90% (Ewel 1982). Mangrove saplings were abundant in the southeastern clear areas. The mangroves seemed better suited for the current conditions in the southeastern corner including the hydrolic conditions and soil dynamics, could grow and expand where *S. terebinthefolia* could not.

The eastern portion of the twelve hectares borders the Hardy Matheson Preserve. This area is mostly dominated by mangrove forest. This is the likely source of mangrove recruitment onto the fallow landsite. *S. terebinthefolia* initially recruited from the western portion of the landsite, and now dominates the western portion of the site. In this case study, *S. terebinthefolia* recruited in and came to dominate a portion of the site but was unable to expand into the entire site. Where *Schinus* dominates it appears to have begun to shade itself out.

Future Management: In our study site, mangrove forest was able to recruit well and spread in the eastern portion of the site. These trees provide a desirable community for a number of well documented reasons, and will be encouraged to develop further. Future removal of *Schinus* trees is planned for the remainder of the site, with the eventual goal of removing these trees from the entire landsite. We plan to eradicate the remaining *Schinus* trees by using a cut stump treatment and then manually removing them. This will expand the available area for desired species and

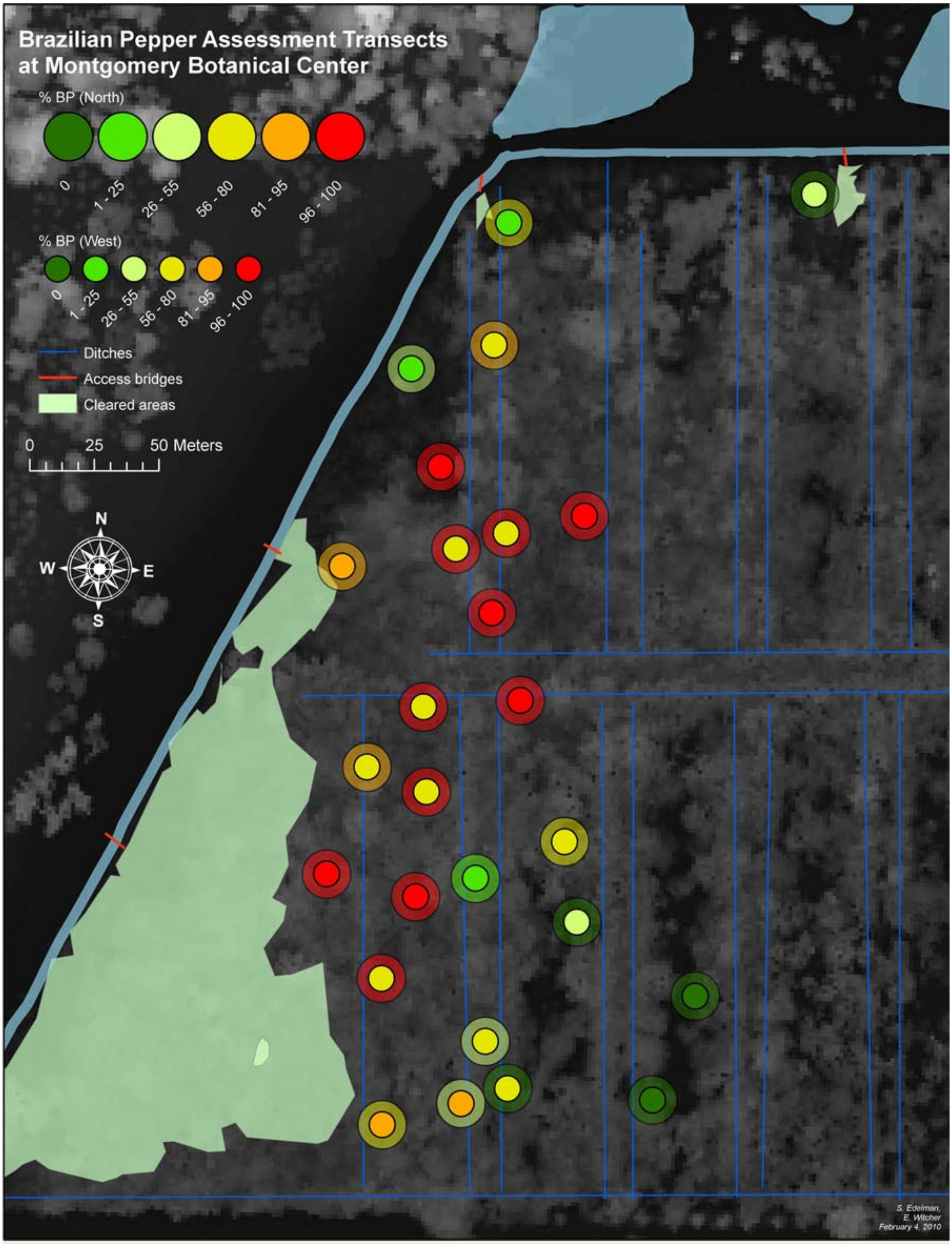


Figure 9. *Schinus terebinthefolia* assessment transects on the study site. Random points were assigned in the transition area between *Schinus* and mangrove. A 10 m transect to the north and a 10 m transect to the west were measured. For each point, the large circle is the North Transect and the smaller circle is the West Transect. Red = 100% canopy of *Schinus*; Green = 100% canopy of Mangrove.

Image: Sara Edelman

Figure 10. Non-vegetated area in the southeast portion of the study site, surrounded by *S. terebinthefolia* thicket (St). No *Schinus* seedlings were observed here, but many mangrove seedlings (M) were observed.

Transect Number	East- West Transect Line	North- South transect Line
1	25%	0%
2	0%	0%
3	0%	0%
4	25%	75%
5	80%	95%
6	100%	100%
7	100%	100%
8	75%	70%
9	50%	0%
10	20%	25%
11	75%	50%
12	100%	0%
13	15%	65%
14	100%	100%
15	65%	100%
16	90%	100%
17	100%	100%
18	100%	100%
19	75%	90%
20	100%	100%
21	100%	100%
22	60%	100%
23	100%	55%
24	95%	95%

Table 1: *S. terebinthefolia* percent cover at each Transect Line. *S. terebinthefolia* dominates roughly half of the disturbed area. Each transect number is comprised of two lines. One runs east to west and the other runs north to south.

stop further *Schinus* recruitment. We hope that a near-future aerial view of the site will show a dense mangrove forest on the eastern edge, with a managed open space on the western edge where the *Schinus* trees have been eliminated.

ACKNOWLEDGEMENTS:

The authors thank the Montgomery Botanical Center team for helpful collaboration throughout the investigations. We especially thank Ericka Witcher, for assistance with GIS training and preparation of the vegetative survey, Jared Fogg, for use of the Montgomery Archive, Chad Husby and Tracy Magellan for species identification help, and Philis Edelman, Tracy Magellan, and Ericka Witcher for assistance in the field.

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Book Review

Naczi, Robert F.C. & Bruce A. Ford [editors] 2008. *Sedges: Uses, Diversity, and Systematics of the Cyperaceae*. Monographs in Systematic Botany from the Missouri Botanical Garden, Volume 108. Missouri Botanical Garden, St. Louis, Missouri, USA.

xi + 298 p. ISBN 978-1-930723-72-6

[hard cover] (ISSN 0161-1542 for the "Monographs") Price: US$75.00

Order from: Missouri Botanical Garden Press – phone: 888-271-1930, e-mail: orders@mbgpress.info

This book is a collection of 14 articles originally presented as conference contributions on the "Sedges 2002." This was the first international conference devoted to Cyperaceae and was held 6-8 June 2002 on the campus of Delaware State University.

Articles in the book deal with the whole family of Cyperaceae, several groups of species, and even a single species. The geographical scope covered by the authors ranges from global distributions to occurrences in a single National Forest. Most of the botanical disciplines are well represented: the book covers ethnobotany, weed science, phytogeography, plant ecology, and taxonomy.

The first two articles, one by David A. Simpson and the other by Charles T. Bryson and Richard Carter, cover the use of Cyperaceae. Compared with grasses, the sedge family members have limited economic importance. The lists of weedy species are comprehensive and the long and exhaustive tables of species take up a large section of the first one hundred pages of the book. Even so, compared to the grasses the sedge family contains a much smaller number of cultivated species and only a relatively small part of the sedge family is weedy. I hope the full lists will be made accessible on a searchable web site.

The next section contains five chapters dealing with phytogeography and ecology

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of sedges sensu lato. The phytogeography of the sedge family in the Coastal Plains of North America is nicely covered in Bruce A. Sorrie's contribution. Philip E. Hyatt illustrates the distribution of sedges in Kisatchie National Forest in Louisiana, USA. This forest forms a mosaic of holdings over seven parishes and hosts 59 *Carex* species. The distribution of *Carex* taxa is compared to the ecological classification of "landscape-scale" plant communities. The next chapter has a monospecific focus: it deals with the population and cover structure in Pennsylvania of a globally rare sedge, *Carex polymorpha*. The size of the plots used in this study (10 × 10 m for trees and woody shrubs, and 2 smaller 1 × 1 m plots) was far too small for sampling this type of vegetation. The authors also sampled only those stands that had at least some *Carex polymorpha* growing in them. This gives skewed and biased results. The vegetation composition was distilled into cladograms in which the species composition and other information were lost—I would prefer to have had vegetation tables of relevés (plots) and the species growing in them.

The next contribution by Jacques Cayouette is a distinct improvement. He distills his *Carex* experience into a balanced article on the phytogeography and taxonomy of the 97 species of *Carex* growing in the Quebec/Labrador flora north of 54th parallel. Taxonomic problems exist, he says, in 46% of them. *Carex* taxonomists and molecular botanists will find this chapter a source of inspiration.

The remaining seven chapters are devoted to the taxonomy of various groups of the sedge family.

Studies of the allozyme variation in the genus *Carex* from 1986 to 2001 are summarized in the article by Leo P. Bruederle et al. Allozyme studies of over 50 species indicate that the rhizomatous sedges are predominantly outcrossing, whereas the cespitose sedges are more inbreeding. A similar situation was found in grasses by G.L. Stebbins.

"Phylogeny and patterns in *Carex* sect. Ovales ..." are discussed in Andrew L. Hipp's chapter. ITS and 5.8S sequences of 79 species of the section Ovales and 28 other species of the subgenus Vignea were analyzed. The study concluded that *Carex illota* does not belong to section Ovales, a section that without the sedge is monophyletic. Based on the DNA analyses, a monophyletic section Ovales should also include the Asiatic *Carex maackii* and the Euro-Asiatic *Carex bohemica*.

The *Carex acuta* complex of section Phacocystis is treated in the chapter by Julie A. Dragon and David S. Barrington. A study of two spacers, ITS and ETS, revealed four monophyletic clades within this section. The taxonomic implications of this study were published recently in the American Journal of Botany (96:1896-1906. 2009) .

Bruce A. Ford, Robert F.C. Naczi, and Julian R. Starr combine morphological analysis with the DNA analysis in their study of the section Phyllostachyae (*Carex backii*, *C. saximontana*, etc.). The number of species now recognized in section Phyllostachyae has doubled over a ten-year period.

Phylogeny of the unispicate taxa in the tribe Cariceae is addressed in the chapter by Julian R. Starr, Stephen A. Harris, and David A. Simpson. This chapter is an anomaly in this collection, since it is the second part of an article; the first part was published earlier in the 2007 volume of Systematic Botany (29: 528-544). The chapter can be hard to follow for those who have not read the first part.

Preliminary results of the study of the neotropical genus *Pleurostachys* by Wiliam Wayt Thomas and Marccus Alves reveal 23 species, including 5 new undescribed ones. The DNA results call for modification of the earlier sectional division of the genus.

In the last chapter, A. C. Araújo et al. present the cladistic analysis *Rhynchospora*, section Pluriflorae. The results show that the subsectional division has to be revised.

The articles in this volume cover a wide variety of problems in the genus *Carex* and touch on some problems of the whole Cyperaceae family. On the negative side, the topics and taxa dealt with in this volume are those that occur in eastern North America—western *Carex* taxa receive brief treatment. On the positive side, this collection is a great source of information and I found the extensive bibliographies useful, even more useful than bibliographies available electronically on the internet.

Gleanings

Notes on papers (some technical and others less so) that caught the Editor's eye

Journal articles

The invisible hand of floral chemistry

A Perspective in Science 321: 1163-1164

Robert A Raguso

This short article takes the non-molecular biologist into the world of floral scent using a study on *Nicotiana attenuata* (details in the full paper in Science 321: 1200-1202). The key result is that a mixture of nicotine (which has a repelling taste and odor for its hummingbird and hawkmoth pollinators) and benzyl acetone (the most attractive scent component) is linked to the production of more seed in larger capsules

The power of two. Profile of Douglas and Pamela Soltis

Science 329: 623-625. August 6th 2010

This news article written by Elizabeth Pennisi is somewhat different from the norm for Science. The Soltises' story is one of common independent interests evolving into joined careers. Their careers seem to have found another link to the past. They worked at Washington State, the same university where the late Marion Ownbey had worked and contributed to knowledge of the genus. This is short but powerful story about a path in botanical intellectual history.

Despite progress: biodiversity declines

Newsfocus in Science 329: 1273-1280. September 10th 2010

Contributions by Elizabeth Pennisi and Dennis Normile

Two useful essays that report on efforts in Botanical Gardens to grow threatened species and of work to preserve forests in Indonesia.

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