

**2012 CANR Research Report:
Deer Herbivory of "New" Landscape Plants and Fruits for the Retail Market**

Gary W. Knox
University of Florida/IFAS
North Florida Research and Education Center
155 Research Rd.
Quincy, FL 32351
850/875-7100
Fax 850/875-7188
gwknex@ufl.edu

Introduction

White-tailed Deer (*Odocoileus virginianus*) are capable of causing extensive damage to ornamental plants and agricultural crops (Conover 1997, Conover and Kania 1988, Garrison and Lewis 1987, Stratton and Smathers 1996). Loss of natural habitat coupled with restriction of hunting in developed areas has increased the frequency and extent of damage inflicted on ornamentals and crops by deer throughout the southeastern U.S.

Deer can be deterred from browsing ornamentals and crops through a variety of options; however, nearly all are costly, unsightly, work for only a brief period of time, or are considered objectionable to some members of the public (Andelt et al. 1994, Conover 2001, Mulinas et al. 1994, Rosenberry et al. 2001). A more viable, long-term option for preventing deer damage to ornamentals and crops entails selecting species or varieties that deer find unpalatable for most if not the entire calendar year (Conover and Kania 1988). Many studies of foraging preferences found captive deer may not feed in a manner typical of free-ranging individuals (Crouch 1966, Sauve and Cote 2006). Use of free-ranging deer is a superior means of evaluating impacts of browsing pressure on ornamentals.

Current drivers of nursery sales appear to be edible plants as well as "new plants." Edible plants are vegetables, herbs and fruit trees but also may include other shrubs, vines and perennials with edible fruits or plant parts. The retail market for edibles often dramatically increases during economic recessions, such as the current recession. The crop category of "new plants" developed as a result of an ever-sophisticated gardening public desiring plants that are new, improved or different from run-of-the-mill, bread-and-butter plants. New plants have higher profit margins because of their novelty and limited supply. However, growers bear greater risk when growing and selling "new plants" since many new plants are insufficiently tested for performance or susceptibility to pests such as deer.

Background

Conversion of natural habitat to agricultural lands and housing developments coupled with restriction of hunting in developed areas have increased both the contact between humans and deer as well as the frequency and extent of damage inflicted on ornamentals by deer throughout the southeastern U.S. Selecting plants that are less preferred by foraging deer is one segment of an IPM plan (Kays et al., 2003). A recent two-year study at NFFREC on deer feeding preference of native wildflowers found that some were completely destroyed while others of the same genus were left untouched (DeGroote et al., 2011).

Numerous ornamental plant lists of resistant to desirable species for deer preference are available from many states including Florida (Main et al., 2010) and Georgia (Wade and Mengak, 2010). However, previously untested or newly introduced plants should be evaluated for deer browsing preferences to accurately characterize these plants' propensity for being browsed by deer. Deer herbivory has not yet been reported for many dooryard fruits and "new plant" crops.

Current CANR Funded Research

This project is investigating foraging preference of wild, free-ranging White-tailed Deer among fruit plants for the retail market and "new plants" for north Florida and south Georgia. Results will be used to develop recommendations regarding the likelihood of deer browsing damage to these species. Our results should ultimately reduce economic losses incurred by individuals interested in maintaining plantings containing these species. Additionally, some of these plant species have not been extensively evaluated in the field and so this study will contribute knowledge to the Green Industry regarding their performance in the landscape.

Four newer dooryard fruits were used in the study along with the deer-preferred peach as a "control". The fruit selections were *Ficus carica* 'Brown Turkey' (fig), *Olea europaea* 'Arbequina' (olive), *Punica granatum* 'Russian #8' (pomegranate), *Vaccinium* 'Top Hat' (blueberry) and *Prunus persica* 'Ruby Prince' (peach; the deer-preferred "control"). The four "new" ornamentals used in this study were *Distylium* 'Vintage Jade' (distylium), *Magnolia* 'MicJUR01' (Fairy Magnolia® Blush; magnolia), *Punica granatum* 'Purple Sunset' (ornamental pomegranate), *Thuja* 'Green Giant' (arborvitae) and *Raphiolepis* 'Snow White' (Indian hawthorn; the deer-preferred "control").

Four volunteers' homesites were selected based on past deer damage to landscape plantings as well as willingness to collect data. The fifth site was the University of Florida North Florida Research and Education Center in Quincy (NFREC). Two of the four volunteer homesites were located in Gadsden County, Florida, approximately 5 (site 1) and 12 miles (site 2) from NFREC. One site was in Grady County, Georgia, approximately 18 miles from NFREC. The final site was in Jackson County, Florida, approximately 25 miles from NFREC.

Plants were planted and treated similarly at all sites. At each site, 4 plants each of five fruits and five ornamentals were planted in a random arrangement in a grid pattern with 6 ft. between plants. All plants were installed April 11-20, 2012. Plants were mulched with pine straw and fertilized once per year with Osmocote 15-9-12, 12-14 month formulation. Ornamentals and blueberry received fertilizer at a rate of 3 lb N/1000 sq ft applied to a 1 ft diameter circle around the stem. Other fruits received fertilizer at a rate of 6 lb N/1000 sq ft applied in a similar manner. Each site was irrigated as needed. Height and average width were measured at planting and will be measured after 1 year. Plant performance and deer feeding damage were rated biweekly. Plant performance was rated biweekly on a scale from 0 – 5 where 0 = dead, 1 = leafless, dormant plant, 3 = average or acceptable appearance and 5 = excellent growth and appearance. Deer browsing damage was rated as None, Insignificant (minor browsing with no effect on overall plant appearance) and Severe (greatly reduced plant size, long-term health or appearance).

Results

All five fruits performed similarly at all sites, receiving ratings of above average from April through October 2012. Thereafter, ratings declined for the four deciduous fruits while ratings for the evergreen olive remained above average. "New" ornamentals performed similarly with all sites reporting above average performance ratings from April through October 2012. Thereafter, the rating for the deciduous pomegranate declined whereas the other four evergreen species maintained above average ratings through December. Thus, all plants performed above-average during the growing season, and these fruits and "new" plants are considered adaptable and ornamental in this zone (USDA 8b).

As of January 2013, three of the five sites reported experimental plants damaged by deer browsing: Gadsden County site 1, Jackson County and NFREC. Total incidents of deer browsing were very minor. Across all plants and sites, insignificant deer browsing occurred on 4-16 plants per month for May 2012 through January 2013. Fewer than two incidents per month of severe browsing occurred from May through November 2012. Only in winter months did severe browsing increase, to 4 and 9 plants in December 2012 and January 2013, respectively.

Statistical analysis of deer browsing data is not possible due to inconsistency of deer browsing to date. The ornamentals, arborvitae and distylium, and the fruit, olive, experienced severe browsing along with the deer-preferred fruit, peach, and deer-preferred ornamental, Indian hawthorn. To date, no severe browsing occurred on blueberry, fig, magnolia or pomegranate (both ornamental and fruiting types).

Data collection will continue through April 2013.

Acknowledgements

Thanks to the Center for Applied Nursery Research (CANR) for funding this study. Thanks to Simpson Nurseries, Monticello, Florida, Clinton Nurseries of Florida, Havana, Florida, and Hackney Nursery, Greensboro, Florida, for providing plants. Thanks to the volunteers providing land, management and time to install and care for plants as well as report data.

Literature Cited and Other References

Andelt, W.F., K.P. Burnham, and D.L. Baker. 1994. Effectiveness of capsacin and bitrex repellents for deterring browsing by captive mule deer. *Journal of Wildlife Management* 58:330-334.

Conover, M.R. 1997. Monetary and intangible valuation of deer in the United States. *Wildlife Society Bulletin* 25:298-305.

Conover, M.R. 2001. Effects of hunting and trapping on wildlife damage. *Wildlife Society Bulletin* 29:521-532.

Conover, M.R., and G.S. Kania. 1988. Browsing preference of white-tailed deer for different ornamental species. *Wildlife Society Bulletin* 16:175-179.

Crouch, G.L. 1966. Preferences of black-tailed deer for native forage and Douglas-fir seedlings. *Journal of Wildlife Management* 30:471-475.

DeGroot, L.W., H.K. Ober, J.H. Aldrich, J.G. Norcini, and G.W. Knox. 2011(In Press). Identification of wildflowers susceptible to deer damage. *Southeastern Naturalist*.

Garrison, R.L., and J.C. Lewis. 1987. Effects of browsing by white-tailed deer on yields of soybeans. *Wildlife Society Bulletin* 15:555-559.

Kays, J.S., M.V. Barlett, and L. Curtis. 2003. Resistance of ornamentals to deer damage. <http://extension.umd.edu/publications/pdfs/fs655.pdf> Accessed 9 November 2011.

Main, M.B., J Schaefer, and G.M. Allen. 1999 (reviewed 2003, 2010). Ornamental plant susceptibility to damage by deer in Florida. <http://edis.ifas.ufl.edu/uw137> Accessed 9 November 2011.

Mulinas, M.C., A.F. Rhoads, and J.R. Mason. 1994. Effectiveness of odour repellents for protecting ornamental shrubs from browsing by white-tailed deer. *Crop Protection* 13:393-397.

Rosenberry, C.S., L.I. Muller, and M.C. Conner. 2001. Movable, deer-proof fencing. *Wildlife Society Bulletin* 29:754-757.

Sauve, D.G., and S.D. Cote. 2006. Winter forage selection in white-tailed deer at high density: Balsam fir is the best of a bad choice. *Journal of Wildlife Management* 71:911-914.

Stratton, G.R., and W.M. Smathers, Jr. 1996. Crop damage levels in South Carolina imply a changing role for white-tailed deer hunters. Pp. 92-97 in Johnson, R., ed. A Symposium on the Economics of Wildlife Resources on Private Lands. 5-7 August 1996, Auburn University, Auburn, AL.

Wade, G.L. and M.L. Mengak. 2010. Deer-tolerant ornamental plants.
[http://www.caes.uga.edu/Publications/pubDetail.cfm?pk_id=7872&pg=np&ct=deer tolerant&kt=&kid=&pid=](http://www.caes.uga.edu/Publications/pubDetail.cfm?pk_id=7872&pg=np&ct=deer_tolerant&kt=&kid=&pid=) Accessed 9 November 2011.