

**NAME: Jan P. Nyrop**

**DEPARTMENT: Entomology**

**TITLE: Professor and Associate Dean**

**CAMPUS ADDRESS: 343 Roberts Hall, Ithaca/ Barton Laboratory, Geneva**

**PHONE: 607 255 2552, Ithaca/ 315 787 2355, Geneva**

**E-MAIL: jpn2@cornell.edu**

**EDUCATION**

B.S.	1977	Wildlife Ecology	University of Maine
M.S.	1979	Entomology	Michigan State University
M.S.	1982	Systems Engineering	Michigan State University
Ph.D.	1982	Entomology	Michigan State University

**ACADEMIC RANKS (year achieved)**

**Professor: 1999**

**Associate Professor: 1992**

**Assistant Professor: 1985**

**PROGRAM OVERVIEW**

Research: The goal of my research is to improve management of plant feeding arthropods. I am interested in improving the effectiveness of natural enemies, in improving how decisions are made to control pests, and in applying quantitative tools to better understand the ecology of arthropod pests and the plants they feed upon. Recent work has focused on the basis for and outcomes of plant mediated interactions between pest and predator mites; the optimal allocation of resources to monitor invasive species; and how pest attraction to and retention in a trap crop influence the overall effectiveness of trap cropping as a pest management strategy.

Teaching: I previously co-taught a course on biological invasions with Dr. Ann Hajek. I no longer do so because of my administrative responsibilities. The purpose of this course was for students to learn about the biology and ecology of invasions, the expanding problems caused by invasive species and how invasions are mitigated and managed. These topics are grounded in biology; however, they have social, economic and philosophical implications. I enjoy teaching the course because it integrates fundamental biology, applications of biological understanding, and social and economic issues. This breadth lends itself to a variety of teaching styles and active, participatory learning.

Extension: I have worked with several extension programs to provide practitioners with knowledge and tools to improve pest management. Clients have ranged from fruit and grape growers to producers of biological control agents. Currently, I work to advance economic development in the region and state by expanding the production and value of food and agricultural systems.

Administrative: Between 2007 and 2015 I served as a senior associate dean of the college. My responsibilities included faculty affairs, department and program reviews, sponsored research oversight, management of core research funds, and academic aspects of facilities and human resources. I now serve as Director of the Cornell University Agricultural Experiment Station and the Goichman Family Director of Cornell AgriTech. In these roles I work to align experiment station programs and activities with college priorities by administering federal funding to support agricultural and life sciences research, by overseeing research program development, and by promoting integration of research and its application to improve communities and peoples' lives.

## AREAS OF ACADEMIC EXPERTISE

Insect ecology, integrated pest management, biological control, sampling and decision making, risk assessment, quantitative population ecology, invasive species

## PROFESSIONAL EXPERIENCE

<u>Year</u>	<u>Experience</u>
1977-80	Research Assistant, Department of Entomology, Michigan State University, East Lansing, MI
1978-80	Forest Insect Specialist, Michigan DNR, Forest Management Division, East Lansing, MI
1981-82	Research Assistant, Department of Entomology, Michigan State University, East Lansing, MI
1982-85	Extension Associate, IPM Program, Cornell University, Geneva, NY
1985-1992	Assistant Professor, Department of Entomology, New York State Agricultural Experiment Station, Cornell University, Geneva, NY
1992-1999	Associate Professor, Department of Entomology, New York State Agricultural Experiment Station, Cornell University, Geneva, NY
1999-	Professor, Department of Entomology, New York State Agricultural Experiment Station, Cornell University, Geneva, NY
2004-2007	Chair, Department of Entomology, Cornell University, Ithaca, NY
2007-2015	Senior Associate Dean, College of Agriculture and Life Sciences, Cornell University
2015-	Director Cornell University Agricultural Experiment Station and Associate Dean
2017-	Interim Director New York State Agricultural Experiment Station

## SABBATICALS AND STUDY LEAVES

1994 Developing methods for monitoring pest populations through time; Department of Theoretical Production Ecology, Wageningen Agricultural University, Wageningen, the Netherlands

## HONORS AND AWARDS

1999 Excellence in IPM Award – presented by NY IPM Program

- 1994 Research Fellowship, Wageningen Agricultural University, Wageningen, the Netherlands
- 1982 Entomological Society of America John Henry Comstock Award for graduate studies
- 1982 Dr. Robert R. Dreisbach Award, Department of Entomology, Michigan State University
- 1980 Dr. Paul Wooley Award, Department of Entomology, Michigan State University
- 1976 Dr. Robert Ashman Award, School of Forestry, University of Maine

## **ACADEMIC RESPONSIBILITIES**

### **ADMINISTRATIVE RESPONSIBILITIES**

Director Cornell University Agricultural Experiment Station  
Director Cornell AgriTech, Geneva, NY

### **RESEARCH RESPONSIBILITIES**

Research Professionals Supervised: Karen Wentworth, David Combs

Recent Research Accomplishments:

- Discovered that UV light can be used to manage spider mites.
- Discovered that leaf trichomes promote phytoseiid mite abundance primarily through the behavioral response of the mites; factors that likely drive the evolution of this behavior are reduced risk of predation and increased capture of alternate foods.
- Determined that carbon balance in apple trees integrates the affects of multiple stresses.
- Determined that mite injury to grapes can result in reduced quality; however, high mite numbers are needed. Also showed that pest mites can be managed using biological control.
- Evaluated reduced risk management tactics for apple insect pests and determined that key pests can be controlled with these tools.
- Developed methods for assessing the quality of mass-produced biological control agents.
- Developed novel tools for managing onion maggot including risk assessment, planting date manipulation and insecticidal baits.
- Determined that the effectiveness of trap cropping for whitefly management in greenhouses is strongly dependent on patterns of whitefly mortality on the cash crop and the retention of whitefly adults on the trap crop.
- Discovered that phytoseiid predators of western flower thrips cause invulnerable adults to avoid habitats with predators and induce up to 50% reductions in net oviposition compared to adult thrips not exposed to predators.
- Using optimal control theory to calculate time-dependent invasive species surveillance policies that minimize costs, determined that the best strategies often use intense early sampling, followed by reduced sampling effort.

## TEACHING AND ADVISING RESPONSIBILITIES

ENT 2020 Invasions, Trading Species in a Shrinking World (previously taught yearly with Dr. Ann Hajek)

The purpose of this course is for students to learn about the biology and ecology of invasions, the expanding problems caused by invasive species and how invasions are mitigated and managed. These topics are grounded in biology; however, they have social, economic and philosophical implications. I enjoy teaching the course because it integrates fundamental biology, applications of biological understanding, and social and economic issues. This breadth lends itself to a variety of teaching styles and active, participatory learning.

## EXTENSION RESPONSIBILITIES

Currently, I work to advance economic development in the region and state by expanding the production and value of food and agricultural systems.

## EXTENSION ACTIVITIES

- I work with regional economic development councils, entrepreneurs and established businesses to develop strategies and tactics for expanding the food and agriculture sector of the New York economy.

## GRADUATE FIELD MEMBERSHIP

Entomology

## GRADUATE MAJORS

Doo Hyung Lee	PhD	2011
Mark Sarvary	PhD	2006
Amy Roda	PhD	2000
Dan Dalthorp	PhD	1998
Mark Schmaedick	Ms	1993
Timothy Martinson	PhD	1991
Abby Jean Seaman	Ms	1990
Tracey Frisch	Ms	1988
Timothy Martinson	Ms	1987

## GRADUATE MINORS

Mathew Holden	PhD	2015
Elaine Fok	Ms	2013

Sarah Jandricic	PhD	2012
Rebecca Loughner	PhD	2007
Maria Diaz	Ms	2006
Francisco Badenes-Perez	PhD	2005
Ben Werling	Ms	2004
Fred Musser	PhD	2003
Rebecca Smyth	PhD	2002
Melanie Filotas	PhD	2002
Mark Schmaedick	PhD	2000
Dan Waldstein	PhD	2000
Jose I. Lopez-Arroyo	PhD	1999
Carlos Portillo-Aguilar	Ms	1999
Luis Vasquez	PhD	1998
Scott Lawson	Ms, PhD	1993, 1998
Ana Helena D. Francesconi	PhD	1996
Celso Omató	PhD	1991
Molly Hunter	PhD	1991
Roger Sher	Ms	1991
Christopher Hoffmann	PhD	1990
Zhi Quang Zang	PhD	1993
Billy Amman	PhD	1992

## **OTHER PROFESSIONAL ACTIVITIES**

### **PROFESSIONAL SOCIETIES**

Entomological Society of America  
Phi Kappa Phi  
AAAS

### **EDITORIAL BOARDS**

2002-2003 Subject editor, Environmental Entomology  
1996-2001 Associate editor, Entomologia Experimentalis et Applicata  
1994-1996 Subject editor, Experimental and Applied Acorology  
1990-1991 Subject editor, Journal of Economic Entomology

### **COMMITTEE ASSIGNMENTS**

#### **International/National**

2002 Member and chair, Journal of Economic Entomology Editorial Review Board  
2001 President, Entomological Society of America, Northeast Branch  
2000 Program co-chair, Entomological Society of America, Northeast Branch  
2001 Panel Manager, USDA NRI Biobased pest management grants review panel  
2000 USDA NRI Biobased pest management grants review panel  
1999 USDA NRI Biobased pest management grants review panel

### University

2000-2003 University Appeals Panel  
2005-2007 Committee on Financial Policies

### College

2002-2004 NYSAES Computer Committee, chair  
2003 NYSAES adhoc committee for webpage development, chair  
2003-2004 CALS Strategic Communication ad hoc Committee  
2003-2004 CALS Agricultural Science Curriculum Committee

### Department

2001-2003 Department of Entomology Graduate Admissions Committee

## RESEARCH PANELS

1999-01 National Research Council Committee on the Scientific Basis for Predicting the Invasive Potential of Non-Indigenous Pests of Plants in the U.S. Panel charged with evaluating the predictability of invasiveness by exotic organisms.

## CONSULTING

1995 One week consultancy in Brazil on mite biological control and sampling in apples  
1995 One week consultancy (Florida and California Avocado Commissions) on quantitative assessment of the risk of introducing exotic pests by importing Mexican Avocados

## RESEARCH AND EXTENSION PUBLICATIONS

### Refereed journal articles

- Barba, P., Loughner, R., Wentworth, K., Nyrop, J. P., Loeb, G. M. and Reisch, B. I. 2019. A QTL associated with leaf trichome traits has a major influence on the abundance of the predatory mite *Typhlodromus pyri* in a hybrid grapevine population. Horticulture Research. 6:87
- Cha, D. H., Hesler, S. P., Brind'Amour, G., Wentworth, K. S., Villani, S., Cox, K. D., Boucher, M. T., Wallingford, A., Park S. K, Nyrop J. and Loeb, G. M. 2019. Behavioral evidence for contextual olfactory-mediated avoidance of the ubiquitous phytopathogen *Botrytis cinerea* by *Drosophila suzukii*. Insect Science. 00:1-9.
- Cha, D. H., Hesler, S. P., Wallingford, A. K., Zaman, F., Jentsch, P., Nyrop, J. and Loeb, G. M. 2018. Comparison of commercial lures and food baits for early detection of fruit infestation risk by *Drosophila suzukii* (Diptera: Drosophilidae). J. Econ. Entomol. 111:645-652.
- Hussein, M., Pillai, V. V., Goddard, J. M., Park, H. G., 2, Kothapalli, K. S., , Ross, D. A., , Ketterings, Q. M., Brenna, J. T., , Milstein, M. B., Marquis, H., , Johnson, P. A., , Nyrop, J. P., , Selvaraj, V. 2017. Sustainable production of housefly (*Musca domestica*) larvae as a protein-rich feed ingredient by utilizing cattle manure. PLOS ONE |

- DOI:10.1371/journal.pone.0171708
- Holden, M. P., J. P. Nyrop and S. P. Ellner. 2016. The economic benefit of time-varying surveillance effort for invasive species management. *Journal of Applied Ecology*. 53:712-721.
- Atallah, S. S., M. I. Gomez, J. M. Conrad, and J. P. Nyrop. 2014. A plant-level, spatial, bioeconomic model of plant disease diffusion and control: grapevine leafroll disease. *American Journal of Agricultural Economics*. doi: 10.1093/ajae/aau032
- Lee, D. H., J. P. Nyrop and J. P. Sanderson. 2014 Non-consumptive effects of the predatory beetle *Delphastus catalinae* (Coleoptera: Coccinellidae) on habitat use patterns of adult whitefly *Bemisia argentifolii* (Hemiptera: Aleyrodidae). *Applied Entomology and Zoology*. 4:599-606.
- Gardner, J., M. P. Hoffmann, S. A. Pitcher and J. P. Nyrop. 2012. Recurrent warming to improve cold storage of Trichogrammatids (Hymenoptera: Trichogrammatidae). *Biocontrol Science and Technology*. 22:261-270.
- Holden, M. H., S. P. Ellner, D. H. Lee, J. P. Nyrop, and J. P. Sanderson 2012 Designing an effective trap cropping strategy: the effects of attraction, retention and plant spatial distribution. *J. Appl. Ecol.* 49:715-722.
- Szczepaniec A, S. F. Creary, K. L. Laskowski, J. P. Nyrop and M. J. Raupp. 2011. Neonicotinoid insecticide imidacloprid causes outbreaks of spider mites on elm trees in urban landscapes. *PLoS ONE* 6(5): e20018. doi:10.1371/journal.pone.0020018
- Ugine, T. A., J. P. Sanderson, S. P. Wraight, L. Shipp, K. Wang and J. P. Nyrop. 2011. Binomial sampling of western flower thrips infesting flowering greenhouse crops using incidence-mean models. *Environ. Entomol.* 40:381-390.
- Lee, D. H., J. P. Nyrop and J. P. Sanderson. 2011. Avoidance of natural enemies by adult whiteflies, *Bemisia argentifolii*, and effects on host plant choice. *Biological Control*. 58:302-309.
- B. A. Nault, B. P. Werling, R. W. Straub, and J. P. Nyrop. 2011. Delaying onion planting to control onion maggot (Diptera: Anthomyiidae): efficacy and underlying mechanisms. *J. Econ. Entomol.* 104:1622-1632.
- Lee, D., J. P. Nyrop and J. P. Sanderson. 2010. Effect of host experience of the greenhouse whitefly, *Trialeurodes vaporariorum*, on trap cropping effectiveness. *Entomologia Experimentalis et Applicata*. 137:193-203
- Loughner, R., K. Wentworth, G. Loeb and J. Nyrop. 2010. Leaf trichomes influence predatory mite densities through dispersal behavior. *Entomologia Experimentalis et Applicata*. 134:78-88.
- Loughner, R., K. Wentworth, G. Loeb and J. Nyrop. 2010. Influence of leaf trichomes on predatory mite density and distribution in plant assemblages and implications for biological control. *Biol. Con.* 54:255-262.
- Sarvary, M. A., J. Nyrop and H. Reissig. 2010. Effects of natural enemies and host plants in wild and orchard habitats on obliquebanded leafroller (Lepidoptera: Tortricidae) larval survival. *Biological Control* 55:110-117.
- Agnello, A. M., A. Atanassov, J. C. Bergh, D. J. Biddinger, L. J. Gut, M. J. Haas, J. K. Harper, H. W. Hogmire, L. A. Hull, L. F. Kime, G. Krawczyk, P. S. McGhee, J. P. Nyrop, W. H. Reissig, P. W. Shearer, R. W. Straub, R. T. Villanueva, and J. F. Walgenbach 2009. Reduced-risk pest management programs for eastern U.S. apple and peach orchards: a 4-year regional project. *Amer. Entomol.* 55:184-197.

- Lee, Doo-Hyung, Nyrop, J. P., Sanderson, J. P. 2009. Attraction of *Trialeurodes vaporariorum* and *Bemisia argentifolii* to eggplant, and its potential as a trap crop for whitefly management on greenhouse poinsettia. *Entomol. Exp. Appl.* 133: 105–116
- Loughner R ; Goldman K ; Loeb G ; Nyrop J. 2008 Influence of leaf trichomes on predatory mite (*Typhlodromus pyri*) abundance in grape varieties. *Experimental and Applied Acarology* 45:111-122
- Luczynski A, Nyrop JP, Shi A 2008 Pattern of female reproductive age classes in mass-reared populations of *Phytoseiulus persimilis* (Acari: Phytoseiidae) and its influence on population characteristics and quality of predators following cold storage. *Biological Control.* 47:159-166
- Sarvary, M.A., Nyrop, J., Reissig, H. 2007. Assessment of three techniques for measuring natural enemy inflicted mortality of leafroller larvae in commercial orchards. *Biological control.* 41(3):312-320.
- Sarvary, M. A., Nyrop, J. P., Reissig, H. and K. M. Gifford. 2007. Potential for conservation biological control of the obliquebanded leafroller (OBLR) *Choristoneura rosaceana* (Harris) in orchard systems managed with reduced-risk insecticides. *Biological Control.* 40:37-47.
- Luczynski, A., Nyrop, J.P. and A. Sh. 2007.i Influence of cold storage on pupal development and mortality during storage and on post-storage performance of *Encarsia formosa* and *Eretmocerus eremicus* (Hymenoptera: Aphelinidae) *Biological Control.* 40:107-117
- Reissig, H.; Sarvary, M.; Nyrop, J. 2007. Ecology and management of the obliquebanded leafroller, *Choristoneura rosaceana*, in New York apple orchards. *IOBC-WPRS Bulletin.* 30:61-66
- Musser F. R., Nyrop J. P. and Shelton A. M. 2006 Integrating biological and chemical controls in decision making: European Corn Borer (Lepidoptera: Crambidae) control in sweet corn as an example. *J. Econom. Entomol.* 99:1538–1549.
- Nault, B. A., Zhao, J. Z., Straub, R. W., Nyrop, J.P., and Hessney, M. L. 2006. Onion maggot (Diptera Anthomyiidae) resistance to chlorpyrifos in New York onion fields. *J Econ Entomol.* 99:1375-1380.
- Nyrop, J. P. and Lakso, A. N. 2006. Modeling from a crop protection decision support perspective what is most important? *Acta Hort.* 707:187-195.
- Renkema, J. M., Nyrop, J. P., Difonzo, C., Sears, M. K. and Schaafsma, A. W. 2006. Control decision rule for European chafer (Coleoptera Scarabaeidae) larvae in field corn. *J. Econ. Entomol.* 99:76-84.
- Werling, B. P., J. P. Nyrop and B. Nault. 2006. Spatial and temporal patterns of onion adult activity and oviposition within onion fields that vary in bordering habitat. *Entomol. Exp. Applicat.* 118: 49–59
- Musser, F. R., B. A. Nault, J. P. Nyrop and A. M. Shelton. 2005. Impact of glossy collard trap crop on diamondback moth adult movement, oviposition and larval survival. *Entomol. Exp. Applicat.* 117:71-81.
- Musser, F. R., J. P. Nyrop and A. M. Shelton. 2004. Survey of predators and sampling method comparison in sweet corn. *J. Econ. Entomol.* 97:136-144.
- Roda, A., J. Nyrop and G. English-Loeb. 2003. Leaf pubescence mediates the abundance of non-prey food and the density of the predatory mite *Typhlodromus pyri*. *Exp. Appl. Acarol.* 29:193-211.
- Agnello, A. M., W. H. Reissig, J. Kovach, and J. P. Nyrop. 2003. Integrated apple pest



- management in New York with predator mite establishment and a selective pesticide programme. *Agric., Ecosyst., Environ.* 94: 183-195.
- Lakso, A.N. and J. P. Nyrop. 2002. Carbon balance modeling approaches to integrating the effects of foliar pests, environment, and cultural practices in apples. *Acta Hort.* 584:221-228.
- Waldstein, D. E., W. H. Reissig and J. P. Nyrop. 2001. Larval movement and its potential impact on the management of the obliquebanded leafroller (Lepidoptera: Tortricidae). *The Canadian Entomologist.* 133: 687-696.
- Roda, A., J. Nyrop, G. English-Loeb and M. Dicke. 2001. Leaf pubescence and two-spotted spider mite webbing influence phytoseiid behavior and population density. *Oecologia.* 129:551-560
- Roda, A., J. Nyrop, M. Dicke and G. English-Loeb. 2000. Trichomes and spider-mite webbing protect predatory mite eggs from intraguild predation. *Oecologia.* 125:428-435.
- Dalthorp, D. J. P. Nyrop, and M. J. Villani. 2000. Spatial ecology of the Japanese beetle , *Popillia japonica*. *Entomol. Exp. et Applicata.* 96:129-139
- Dalthorp, D. J. P. Nyrop, and M. J. Villani. 2000. Foundations of spatial ecology: The reification of patches through quantitative description of patterns and pattern repetition. *Entomol. Exp. et Applicata.* 96:119-127.
- Chang, Y., M. J. Tauber, C. A. Tauber and J. P. Nyrop. 2000. Interpopulation variation in *Chrysoperla carnea* reproduction: implications for mass-rearing and storage. *Entomol. Exp. et Applicata.* 95:293-302.
- Hardman, J. M., W. van der Werf and J. P. Nyrop. 1999. Modelling mite dynamics on apple trees in eastern North America. *Proc. 5<sup>th</sup> Int. Symp. on Comp. Mod., Acta Hort* 499:201-209.
- Portillo-Aguilar, C., M. G. Villani, M. J. Tauber, C. A. Tauber and J. P. Nyrop 1999. Entomopathogenic nematode (Rhabditida: Heterorhabditidae and Steinernematidae) response to soil texture and bulk density. *Environ. Entomol.* 28: 1021-1035.
- Nyrop, J. P., M. R. Binns and W. van der Werf. 1999. Sampling for IPM decision making: Where should we invest time and resources? *Phytopathology* 89:1104-1111.
- Dalthorp, D. J. P. Nyrop, and M. J. Villani. 1999. Estimation of local mean population densities of Japanese beetle grubs (Scarabaeidae: Coleoptera). *Environ. Entomol.* 28:255-265.
- Gray, G. M., J. C. Allen, D. E. Burmaster, S. H. Gage, J. K. Hammitt, S. Kaplan, R. L. Keeney, J. G. Morse, D. W. North, J. P. Nyrop, A. Stahevitch and R. Williams. 1998. Principles for conduct of pest risk analysis: report of an expert workshop. *Risk Analysis.* 18:773-780.
- Reissig, W. H., J. P. Nyrop and R. Straub 1998. Oviposition model for timing insecticide sprays against plum curculio. *Environ. Entomol.* 27:1053-1061.
- Tauber, M. J., C. A. Tauber, J. P. Nyrop, and M. G. Villani. 1998. Moisture, a vital but neglected factor in the seasonal ecology of insects: hypotheses and tests of mechanisms. *Environ. Entomol.* 27:523-530.
- Lawson, D. S., J. P. Nyrop and W. H. Reissig. 1997. Assays with commercially produced *Trichogramma* species (Hymenoptera: Trichogrammatidae) to determine suitability for Obliquebanded leafroller (Lepidoptera: Tortricidae) control. *Env. Entomol.* 26:684-693.
- van der Werf, W., J. P. Nyrop, and M. R. Binns. 1997. Adaptive frequency classification: a new methodology for pest monitoring and its application to European red mite (*Panonychus ulmi*, Acari: Tetranychidae). *Exp. Appl. Acarol.* 21:431-462
- Binns, M. R., J. P. Nyrop and W. van der Werf. 1996. Monitoring pest abundance by cascading density classification. *American Entomologist.* 42:113-121.

- Francesconi, A. H. D., A. N. Lakso, J. P. Nyrop, J. Barnard and S. S. Denning. 1996. Carbon balance as a physiological basis for the interactions of European red mite and crop load on 'Starkrimson Red Delicious' apple trees. *J. Amer. Soc. Hort. Sci.* 121:959-966.
- Francesconi, A. H. D., C. B. Watkins, A. N. Lakso, J. P. Nyrop, J. Barnard and S. S. Denning. 1996. Interactions of European red mite and crop load on maturity and quality, mineral concentrations, and economic value of 'Starkrimson Delicious' apples. *J. Amer. Soc. Hort. Sci.* 121:967-972.
- Hoffman, M. P., J. P. Nyrop, J. J. Kirkwyland, D. M. Riggs, D. O. Gilrein and D. D. Moyer. 1996. Development and validation of a sequential sampling plan for lepidopterous pests of fresh market sweet corn in New York. *J. Econ. Entomol.* 89:386-395.
- Lakso, A. N., G. B. Mattii, J. P. Nyrop and S. S. Denning. 1996. Influence of European red mite on leaf and whole-canopy carbon dioxide exchange, yield, fruit size, quality, and return cropping in 'Starkrimson Delicious' apple trees. *J. Amer. Soc. Hort. Sci.* 121:954-958.
- Lawson, D. S., J. P. Nyrop and T. J. Dennehy. 1996. Aerial dispersal of European red mites (Acari: Tetranychidae) in commercial apple orchards. *Exp. Appl. Acarol.* 20:193-202.
- Schmaedick, M. A. and J. P. Nyrop. 1995. A method for sampling arthropod pests with uncertain phenology with application to spotted tentiform leafminer *Phyllonorycter blancardella* (Lepidoptera: Gracillariidae). *J. Econ. Entomol.* 88:875-889.
- Nyrop, J. P., M. J. Villani and J. A. Grant. 1995. A control decision rule for European chafer (Coleoptera: Scarabaeidae) larvae infesting turfgrass. *Environ. Entomol.* 24:521-528.
- Agnello, A. M., J. Kovach, J. P. Nyrop, W. H. Reissig, D. I. Breth, and W. F. Wilcox. 1994. Extension and evaluation of a simplified monitoring program in New York apples. *Amer. Entomol.* 40:37-49.
- Tauber, M. J., C. A. Tauber and J. P. Nyrop. 1994. Soil moisture and post-dormancy emergence of Colorado potato beetles (Coleoptera: Chrysomelidae): A descriptive model and field emergence patterns. *Environ. Entomol.* 23:1485-1496.
- van der Werf, W., J. P. Nyrop and J. M. Hardman. 1994. Sampling predator/prey ratios to predict cumulative pest density in the mite - predator mite system *Panonychus ulmi* - *Typhlodromus pyri*. *Aspects Applied Biology* 37:41-52.
- Nyrop, J. P., M. R. Binns, W. van der Werf, and J. Kovach. 1994. Cascading tripartite binomial classification plans to monitor European red mite (Acari, Tetranychidae) through a season; Development and evaluation of a new methodology for pest monitoring. *Exp. Appl. Acarol.* 18:123-153.
- Nyrop, J. P., J. Minns and C. Herring. 1994. Influence of ground cover on dynamics of *Amblyseius fallacis* Garman (Acarina: Phytoseiidae) in New York apple orchards. *Agric. Ecosys. Environ.* 50:61-72.
- Nyrop, J. P. and W. van der Werf. 1994. Tripartite classification and adaptive frequency classification sampling plans for monitoring population density through time. *Aspects Applied Biology.* 37:53-62.
- Lawson, D. S., W. H. Reissig, J. P. Nyrop and S. K. Brown. 1994. Management of arthropods on columnar trees using exclusionary cages. *Crop Protection.* 13:346-356.
- Lawson, D. S., S. K. Brown, J. P. Nyrop, and W. H. Reissig. 1994. Micro climate and columnar apple tree performance within insect exclusionary cages. *HortScience* 29(9) : 1008-1015.
- Schroeder, P. C., M. G. Villani, C. S. Fergusun, J. P. Nyrop, and E. J. Shields. 1993. Behavioral interactions between Japanese Beetle (Coleoptera: Scarabaeidae) grubs and an

- entomopathogenic nematode (Nematoda: Heterorhabditidae) within turf microcosms. *Environ. Entomol.* 22:595-600.
- Walde, S. J., J. P. Nyrop, and J. M. Hardman. 1992. Dynamics of *Panonychus ulmi* and *Typhlodromus pyri*: Factors contributing to persistence. *Exp. Appl. Acarol.* 14:261-291.
- Hoffman, C. J., T. J. Dennehy, and J. P. Nyrop. 1992. Phenology, monitoring, and control decision components of the grape berry moth (Lepidoptera : Tortricidae) risk assessment program in New York. *J. Econ. Entomol.* 85(6) 2218-2227.
- Nyrop, J. P and M. R. Binns. 1992. Algorithms for computing operating characteristic and average sample number functions for sequential sampling plans based on binomial count models. *J. Econ. Entomol.* 85:1253-1273.
- Kruger, S. R., M. G. Villani, J. P. Nyrop, and D. W. Roberts. 1992. Effect of soil environment on the efficacy of fungal pathogens against scarab grubs in laboratory assays. *Biol. Control.* 1:203-209.
- Binns, M. R. and J. P. Nyrop 1992. Sampling insect populations for the purpose of IPM decision making. *Ann. Rev. Entomol.* 37:427-453.
- Villani, M. G. and J. P. Nyrop. 1991. Age-dependent movement patterns of Japanese beetle and European chafer (Coleoptera: Scarabeidae) grubs in soil-turfgrass microcosms. *Environ. Entomol.* 20: 241-251.
- Zhang, Z.-Q., J. P. Sanderson, and J. P. Nyrop. 1991. Foraging time and spatial patterns of predation in experimental populations: A comparative study of three mite predator-prey systems (Acari: Phytoseiidae, Tetranychidae). *Oecologia* 90: 185-196.
- Martinson, T. E., J. P. Nyrop, T. J. Dennehy, and W. H. Reissig. 1991. Field measurement of selection for Twospotted spider mite (Acari: Tetranychidae) resistance to dicofol in apple orchards. *J. Econ. Entomol.* 84: 7-16.
- Martinson, T. E., J. P. Nyrop, T. J. Dennehy, and W. H. Reissig. 1991. Field measurement of selection for European red mite (Acari: Tetranychidae) resistance to dicofol in apple orchards. *J. Econ. Entomol.* 84: 1-6.
- Martinson, T. E., J. P. Nyrop, T. J. Dennehy, and W. H. Reissig. 1991. Temporal variability in repeated bioassays of field populations of European red mite (Acari: Tetranychidae): Implications for resistance monitoring. *J. Econ. Entomol.* 84:1119-1127.
- Hardman, J. M., R. E. L. Rogers, J. P. Nyrop, and T. L. Frisch. 1991. Effect of pesticide applications on abundance of European red mite (Acari: Tetranychidae) and *Typhlodromus pyri* (Acari: Phytoseiidae) in Nova Scotian apple orchards. *J. Econ. Entomol.* 84:570-580.
- Seaman, A. J., J. P. Nyrop, and T. J. Dennehy. 1990. Ecology and impact of egg and larval parasitoids of the grape berry moth (Lepidoptera: Tortricidae) in New York. *Environ. Entomol.* 19: 764-770.
- Trumble, J. T., M. J. Brewer, A. M. Shelton, and J. P. Nyrop. 1990. Transportability of fixed-precision level sampling plans. *Res. Popul. Ecol.* 31: 325-342.
- Nyrop, J. P., W. H. Reissig, A. M. Agnello, and J. Kovach. 1990. Development and evaluation of a control decision rule for first generation spotted tentiform leafminer *Phyllonorycter blancardella* (Lepidoptera: Gracillariidae) in New York apple orchards. *Environ. Entomol.* 19: 1624-1638.
- Nyrop J. P., A. M. Agnello, J. Kovach, and W. H. Reissig. 1989. Binomial sequential classification sampling plans for European red Mite (Acari: Tetranychidae) with special reference to their performance criteria. *J. Econ. Entomol.* 82: 482-490.

- Nyrop, J. P., A. M. Shelton, and J. Theunissen. 1989. Value of a control decision rule for leek moth infestations in leek. *Entomologia exp. et appl.* 53: 167-176.
- Huber, B., J. P. Nyrop, W. Wolf, H. Reissig, A. Agnello, and J. Kovach. 1989. EASY-MACS; a knowledge based system for use in apple integrated pest management. *Comp. and Electr. in Agriculture.* 4: 293-304.
- Martinson, T. E., J. P. Nyrop, and C. J. Eckenrode. 1989. Long range host finding behavior and colonization of onion fields by *Delia antiqua* (Diptera : Anthomyiidae). *J. Econ. Entomol.* 82: 1111-1120.
- Martinson, T. E., J. P. Nyrop, and C. J. Eckenrode. 1988. Dispersal of the onion fly (Diptera: Anthomyiidae) and larval damage in rotated onion fields. *J. Econ. Entomol.* 81: 508-514.
- Nyrop, J. P. 1988. Sequential classification of prey-predator ratios with application to European red mite (Acarina: Tetranychidae) and *Typhlodromus pyri* (Acarina: Phytoseiidae) in New York apple orchards. *J. Econ. Entomol.* 81: 14-21.
- Nyrop, J. P. 1988. Spatial dynamics of an acarine predator - prey system: *Typhlodromus pyri* (Acari: Phytoseiidae) preying on *Panonychus ulmi* (Acari: Tetranychidae). *Environ. Entomol.* 17: 1019-1031.
- Shelton, A. M., J. P. Nyrop, R. C. North, C. Petzoldt, and R. E. Foster. 1987. Development and use of a dynamic sequential sampling program for onion thrips *Thrips tabaci* (Thysanoptera: Thripidae) on onions. *J. Econ. Entomol.* 80: 1051-1056.
- Dennehy, T. J., J. P. Nyrop, W. H. Reissig, and R. W. Weires, Jr. 1988. Characterization of resistance to dicofol in spider mites from New York apple orchards. *J. Econ. Entomol.* 81: 1551-1561.
- Nyrop, J. P., J. T. Olsen, D. G. Mosher, and G. A. Simmons. 1983. Simulation of the effect of jack pine budworm on economic returns from jack pine timber production in Michigan. *Great Lakes Entomol.* 16: 157-165.
- Nyrop, J. P., and G. A. Simmons. 1984. Errors incurred when using Iwao's sequential decision rule in insect sampling. *Environ. Entomol.* 13: 1459-1465.
- Nyrop, J. P. and R. J. Wright. 1985. The use of double sample plans in insect sampling with reference to the Colorado potato beetle *Leptinotarsa decemlineata* (Say). *Environ. Entomol.* 14: 644-649.
- Eckenrode, C. J. and J. P. Nyrop. 1986. Impact of physical injury and commercial lifting on damage to onion bulbs by larvae of onion maggot (Diptera: Anthomyiidae) *J. Econ. Entomol.* 79:1606-1608.
- Foster, R. E., J. J. Tollefson, J. P. Nyrop, and G. L. Hein. 1986. The value of adult corn rootworm population estimates in pest management decision making. *J. Econ. Entomol.* 79: 303-310.
- Nyrop, J. P. and G. A. Simmons. 1986. The temporal and spatial dynamics of an adult parasitoid *Glypta fumiferana* (Vierick) and their influence on parasitism. *Environ. Entomol.* 15: 481-487.
- Nyrop, J. P., R. E. Foster, and D. W. Onstad. 1986. The value of sample information in pest control decision making. *J. Econ. Entomol.* 79: 1421-1429.
- Shelton, A. M., J. P. Nyrop, A. Seaman, and R. E. Foster. 1986. The distribution of European corn borer (*Ostrinia nubilalis* (Hubner)) egg masses and larvae on sweet corn in New York. *Environ. Entomol.* 15: 501-506.
- Kemp, W. P., J. P. Nyrop, and G. A. Simmons. 1980. Simulation of the effects of stand factors on spruce budworm larval redistribution. *Great Lakes Entomol.* 13:81-91.

Technical articles and books

- Board on Agriculture and Natural Resources. 2002. Predicting invasions of nonindigenous plants and plant pests. Committee on the Scientific Basis for Predicting the Invasive Potential of Nonindigenous Plants and Plant Pests in the United States, Board on Agriculture and Natural Resources, National Research Council.
- Binns, M., J. P. Nyrop, and W. van der Werf. 2000. Sampling and Monitoring for Crop Protection Decision Making. CAB International, London.
- Nyrop, J. P., G. English-Loeb and A. Roda. 1997. Conservation biological control of spider mites in perennial cropping systems. *In Perspectives on the Conservation of Natural Enemies of Pests*. P. Barbosa [ed]. Academic Press, New York.
- Nyrop, J. P. 1995. A critique of the risk management analysis for importation of avocados from Mexico. in *Risks of Exotic Pest Introductions from Importation of Fresh Mexican Haas Avocados into the United States*. Morse, J. G., R. L. Metcalf, M. L. Arpaia and R. E. Rice [eds]. University of California, Riverside.
- Nyrop, J. P. and W. van der Werf. 1993. Sampling to predict or monitor biological control. in: L. Pedigo and G. D. Buntin eds. *Handbook of Sampling Methods for Arthropod Pests in Agriculture*. CRC Press, Boca Raton. pp 207-336.
- McInnis, P. J., J. P. Nyrop, and W. A. Wolf. 1992. Programming environment needs for pest management decision support systems. Proc. 4th Inter. Confer. on Computers in Agric., Lake Buena Vista, FL.
- Villani, M. G., S. R. Kreuger, and J. P. Nyrop. 1992. A case study of the impact of the soil environment on insect/pathogen interactions: Scarabs in turfgrass. in *The Use of Pathogens in Scarab Pest Management*. T. J. Jackson and T. R. Glare (eds.) Intercept, London.
- Nyrop, J. P. and M. Binns. 1991. Quantitative methods for designing and analyzing sampling programs for use in pest management. in: D. Pimentel ed. *Handbook of Pest Management in Agriculture*, pgs 67-132, 2nd edition, Volume III, CRC Press, Boca Raton.
- McInnis, P. J. Jr., J. P. Nyrop, and W. A. Wolf. 1990. Agricultural decision support system design; the evolution of EASY-MACS. Proc. 3rd Inter. Confer. on Computers in Agric., Lake Buena Vista, FL.
- Dennehy, T. J., J. P. Nyrop, and T. E. Martinson. 1990. Characterization and exploitation of instability of spider mite resistance to acaricides. in *Managing Resistant to Agrochemicals: From Fundamental Research to Practical Strategies*. M. B. Green, H. M. LeBaron and W. K. Moberg eds. ACS Symposium Series 421 pgs 77-91. American Chemical Society, Washington.
- Nyrop, J. P., B. Huber, and W. Wolf. 1989. Expert systems for use in integrated pest management; opportunities, requirements and pitfall. in Leslie, A. ed. *Pesticide Problems and IPM Solutions for Urban Turfgrass and Ornamentals*. U.S. Govt. Printing Press, EPA.
- Dennehy, T. J., J. P. Nyrop, and T. E. Martinson. 1989. Characterization and exploitation of instability of spider mite resistance to acaricides. in Moberg, W. ed. *Fundamental and Practical Approaches to Combating Resistance*, pgs. 77-91, ACS Symposium Series, American Chemical Society.
- Dennehy, T. J., C. J. Hoffman, J. P. Nyrop, and M. C. Saunders. 1989. Development of low spray, biological and pheromone approaches for control of grape berry moth, *Endopiza viteana* Clemens, in the Eastern United States. in Bostonian, B. ed. *Monitoring and*

Integrated Management of Arthropod Pests of Small Fruits. Intercept, Andover, Hants, England.

Nyrop, J. P. 1989. Threshold use and sampling procedures. in Glass, E. H. ed. National IPM Symposium/Workshop Proceedings, April 1989, Las Vegas, Nevada. NYSAES, Geneva, NY.

#### Extension publications

- Elliot, D. A. Luczynski, J. Nyrop and R. GreatRex. 2005. Standard specification for *Encarsia Formosa* Gahan (Hymenoptera: Aphelinidae). ASTM Standards. 2005.
- Sarvary, M. H. Reissig and J. Nyrop. 2004. Mortality of obliquebanded leafroller due to natural enemies in orchards treated with conventional or reduced-risk insecticides. New York Fruit Quarterly 12(4) 23-26.
- Agnello, A., J. Nyrop, H. Reissig and D. Straub. 2004. Apple arthropod management using reduced-risk pesticide programs. New York Fruit Quarterly 12(3) 15-17.
- Prokopy, R., S. Wright, I. Jacome, W. Coli, J. Nyrop, K. Wentworth and C. Herring. 2003. Establishment and biocontrol potential of released *Typhlodromus pyri* predator mite in Massachusetts apple orchards. Fruit Notes 68(2) 6-11.
- Li, Kuo-Tan, J. P. Nyrop and A. N. Lakso. 2003 Effects of spotted tentiform leafminer and European red mite on apple leaf function and crop development. New York Fruit Quarterly 11(4) 29-31.
- Agnello, A., J. Nyrop, H. Reissig, and D. Straub. 2003. Multi-species pheromone disruption in orchards under a selective pesticide program. New York Fruit Quarterly 11 (1): 17-19.
- Agnello, A. M., J. Kovach, J. Nyrop, H. Reissig, D. Rosenberger, and W. Wilcox. 1999. Apple IPM: A Guide for Sampling and Managing Major Apple Pests in New York State. New York State IPM Program, Geneva. IPM Bull. No. 207. 44 pp. + 27 color plates + 3 inserts.
- Breath, D. J. P. Nyrop and J. Kovach. 1998. A guide for integrated mite control in apples in the northeast. Cornell IPM Publ. #215.
- Nyrop, J. P., A. Roda, K. Wentworth, C. Herring and J. Minns. 1997. Advances in the biological control of spider mites in northeast apple orchards. Proceeding of the New England Fruit School, Sturbridge, MA.
- Prokopy, R., S. Wright, J. Mason, J. Nyrop, K. Wentworth and C. Herring. 1997. Comparative level of establishment of released *Typhlodromus pyri* predatory mites in first-level and second-level IPM Orchard Blocks. Fruit Notes 62(2): 6-16.
- Prokopy, R., S. Wright, J. Black, J. Nyrop, K. Wentworth, and C. Herring. 1997. Establishment and spread of released *Typhlodromus pyri* predator mites in apple orchard blocks of different size: 1997 results. Fruit Notes 62(4): 9-13.
- Eckenrode, C. J. and J. P. Nyrop. 1995 Onion maggot management in New York, Michigan and Wisconsin. N.Y's Food and Life Sciences Bull. No. 144.
- Kain, D. P. and J. P. Nyrop. 1995. Predatory Mites. Insect identification sheet 123. Cornell Cooperative Extension.
- Lakso, A. N., A. H. D. Francisconi, J. Nyrop and S.S. Denning. 1995. Heavy crop loads increase apple tree sensitivity to European red mites. New York Fruit Quarterly. 3:6-8
- Lakso, A. N., A. H. D. Francisconi, J. Nyrop and S.S. Denning. 1995. How crop load changes apple tree sensitivity to European red mite. Proceedings New York Horticultural Society. 140:11-14.

- Nyrop, J. P., D. P. Kain, J. Minns and A. Agnello. 1995. Improving the success of transferring the mite predator *Typhlodromus pyri* from one orchard to another. *Proceedings New York Horticultural Society*. 140:6-10.
- Nyrop, J. P., A. M. Agnello and J. Minns. 1994. Impact of petroleum oil on phytoseiid mite predators. *New York Fruit Quarterly*. 2:11-13.
- Reissig, W. H. and J. P. Nyrop. 1994. Timing insecticide applications for controlling plum curculio using a predictive model. *New York Fruit Quarterly*. 2:3-5.
- Agnello, A. M., H. Reissig, J. Nyrop, J. Kovach, and R. Morse. 1994. Biology and management of apple arthropods. *Cornell Cooperative Extension Bulletin* 231.
- Nyrop, J. P. 1993. Biological control of European red mite in apple orchards. *New York Fruit Quarterly*. 1:13-15.
- Schmaedick, M. A. and J. P. Nyrop. 1993. Sampling second generation spotted tentiform leafminer: a means to reduce overall control costs and facilitate biological control of mites in apple orchards. *New York's Food and Life Sciences Bulletin*. No. 143. 4pp.
- Agnello, A. M., J. Kovach, J. P. Nyrop, W. H. Reissig, and W. Wilcox. 1993. Apple IPM : a guide for sampling and managing major apple pests in New York State. *New York State Integrated Pest Management Program*. Number 207.
- Nyrop, J. P. 1991. Bio-based management of insects and mites in apples. *Proceedings Annual Meeting of the New York Horticultural Society, Rochester, NY*.
- Agnello, A., J. Kovach, J. Nyrop, H. Reissig, and W. Wilcox. 1991. Simplified Integrated Management Program. *A Guide to Apple Sampling Procedures in New York*. Cornell Cooperative Extension. IPM Number 201C.
- Nyrop, J. P., P. McInnis, H. Reissig, A. Agnello, D. Rosenberger, W. Wilcox, and J. Kovach. 1990. EASY-MACS: A computer based system for apple pest management. *Cornell Agric. News Service* #15.
- Nyrop, J. P., W. H. Reissig, and A. M. Agnello. 1989. Mite management in apple orchards; new knowledge and tools. in *Autio, W. ed. Proceedings of the 1989 New England Fruit School, Sturbridge, MA*.
- Petzoldt, C. H., R. Bellinder, W. Fry, R. Loria, J. Nyrop, W. Tingey, R. Wright, and T. Zitter. 1989. A guide to monitoring potato pests in New York state. *New York Integrated Pest Management Program*. No. 107. 58 pg.
- Agnello, A., J. Kovach, J. Nyrop, and H. Reissig. 1990. Simplified Insect Management Program. *A Guide to Apple Sampling Procedures in New York*. Cornell Cooperative Extension. IPM Number 201B.
- Nyrop, J. P. 1987. Integrated mite control in New York apple orchards. Prepared for *Agricultural News Service (3/87 #16)*
- Dennehy, T. J., J. P. Nyrop, R. T. Roush, J. P. Sanderson, and J. G. Scott. 1988. Managing pest resistance to pesticides: A challenge to New York's agriculture. *New York's Food and Life Science Quarterly*. 17: 13-17.
- Nyrop, J. P., and W. H. Reissig. 1988. Basing European red mite control decisions on a census of mites can save costs. *New York's Food and Life Sciences Bulletin* No. 123.
- Agnello, A., J. Kovach, J. Nyrop, and H. Reissig. 1989. Simplified Insect Management Program. *A Guide of Apple Sampling Procedures in New York*. Cornell Cooperative Extension. IPM Number 201A.

- Nyrop, J. P., R. L. Murray, and D. G. Mosher. 1979. Predicting forest tent caterpillar defoliation on sugar maple. Michigan Dept. Natural Resources Forest Pest Management Report MR-2-79. 4p.
- Nyrop, J. P., J. T. Olsen, and D. G. Mosher. 1980. Management of jack pine-jack pine budworm system in the lower peninsula. Michigan Dept. Natural Resources For. Pest Mgt. Rpt. MR-2-80. 4p.
- Nyrop, J. P., G. A. Simmons, and D. G. Mosher. 1982. The economics of pre-salvage alternatives as a method of minimizing spruce budworm losses. Mich. Coop. For. Pest Mgt. Prog. Tech. Rpt. 82-9. 54p.

#### Trade publications

- Nyrop, J. P. and D. Dalthorp. 1995. Deciding on control of scarab grubs. Turf Grass Trends 4(8):8-15.
- Nyrop, J. P. 1995. Petroleum oils and mite biological control: Do they mix? American Fruit Grower. 115:16J-16K.

#### Computer programs

- Binns, M., J. P. Nyrop, and W. van der Werf. 2000. Sampling and Monitoring for Crop Protection Decision Making: MathCad programs for design and analysis url: [www.nysaes.cornell.edu/ent/faculty/nyrop/cpdm](http://www.nysaes.cornell.edu/ent/faculty/nyrop/cpdm)
- Nyrop, J. P., P. McInnis, W. Wolf, H. Reissig, A. Agnello, D. Rosenberger, W. Wilcox, and J. Kovach. 1992. EASY-MACS: A computer based decision system for apple pest management.
- Nyrop, J. P., P. McInnis, W. Wolf, H. Reissig, A. Agnello, D. Rosenberger, W. Wilcox, and J. Kovach. 1991. EASY-MACS: A computer based decision system for apple pest management.
- McInnis, P.J., W. Wolf, and J. P. Nyrop. 1990. EASY MACS : A pest management system for apple production in New York, users guide. New York State Integrated Pest Management Program, Cornell University.