A NEED FOR URBAN IPM

by J.T. Walker

Integrated pest management (IPM), the Environmental Protection Agency (EPA), Intergovernmental Personnel Act (IPA), and other acronyms commonly are heard nowadays by many of us concerned about the welfare of green plants. The subject of IPM requires long study, however I was asked to present some impressions on the subject of urban IPM following a short IPA stay in the Office of Pesticides Program of EPA within view of the Nation's Capitol.

The IPM concept undoubtedly means different things to different individuals or groups, but it is now maturing to the point where authorities are beginning to consider broad definitions similar to that of Dr. Michael Way — "the balanced use of cultural, biological and chemical measures most appropriate to a particular situation in light of careful study of *all* factors involved." Others may have altered viewpoints or slightly different definitions. For instance, Lawrence Apple states IPM is an organized, comprehensive approach to management of the *key* pests in a crop production system (an agroecosystem). Certainly the intention of IPM in all cases is to provide the most effective tools available for successful system management with the least damage to beneficial organisms, human health, and/or general environmental quality.

I believe early IPM definitions might have been intended to mean strictly biological control without pesticide usage. This is not the impression I had with regard to an urban IPM program as might be promulgated by any agency. It was my impression that urban IPM is the concept of an organized approach to the management of key pests in an urban ecosystem (pests include rodents as well as weeds, insects, diseases, etc.).

Such a system would consist of identifying those pests which cause economic injury in the absence of control, defining a management unit (large or small), developing reliable monitoring systems, establishing economic thresholds, and developing a strategy through multiple tactics for pest management with the least insult on our environment. In some instances the concept would include the development of models for predicting pest behavior as a management tool. Then, and this perhaps is the most difficult, putting the system together in a workable package or delivery system.

Why is EPA interested in developing an urban IPM program? Why should the agency be concerned? When Congress created EPA they issued a mandate to protect our environment and the health and safety of our population. Now 74% of our population resides in urban areas and the intensity of pesticide usage appears to be increasing in urban areas. EPA therefore believes an IPM system should be initiated because of potential health and safety hazards to all who reside in our cities and their suburbs. Incidentally, fewer than 70 of the 435 members in the House of Representatives of the 95th Congress are from agricultural areas. This demonstrates the population shift.

In reporting the results of sampling individuals in 64 cities for the presence of chemicals in human urine[1], EPA indicates that the general population is being exposed to chemicals which have originated from certain pesticides. It is estimated that at least 75% of the 2.5 million homes in Florida are treated as many as 4 to 6 times annually for insect control and one-half of the lawns are treated with herbicide (Dr. William Ennis, Agricultural Research Center, Ft. Lauderdale, Fla.). Also, according to Dr. Ennis's figures, there are over 325 golf courses in the 3 most populous southeastern Florida counties, each being treated with insecticides or herbicides 4-6 times annually. According to the National Parks Service (NPS) authorities over 200,000 lbs of all types of pesticides were applied on 21,000 acres of the

[1]Kutz, F.W., R.S. Murphy, and S.C. Strassman. 1978. Survey of pesticide residues and their metabolities in urine from the general population. pp. 363-369. *IN* Pentachlorophenol [Ed. K.R. Rao], Plenum Publishing, New York, N.Y.

NPS in 1975. Twenty-two percent of total pesticide use was for trees and shrubs, 18% for public health and visitors comfort, 12% for site protection and restoration, 10% for turf protection, and the remainder for miscellaneous areas and reasons. The largest percentage of total use in nine regional areas, *adjusted by acreage*, is in the National Capital Parks Region with 65%.

Pesticide expenditures in the U.S. exceeded $2.8 billion in 1978 (Fig. 1). Information on what percentage of this amount is expended for use in strictly urban situations is difficult to ascertain. Nevertheless, when the total acreage ascribed to transportation rights-of-way, parks, mosquito control districts, housing developments, homelawns, recreational facilities, and gardens is considered, I believe we would be amazed at how much area received one or more pesticide applications annually. Naturally, these are dilute sprays but there may be instances where there is superimposition of different materials. Figure 1 illustrates the proportion of various types of pesticide expenditures based on the total in U.S., and expenditures may reflect, with moderate accuracy, an indication of usage.

Inasmuch as it is difficult to monitor urbanities (at the present time ways are being tested for agricultural applicators) for pesticide exposure, and there are no re-entry standards for persons entering urban sprayed areas, perhaps the EPA should rightfully be concerned. Furthermore, the same economic restraints which may limit pesticide usage in rural areas do not always limit applications in urban centers. "Perfect" gardens and lawns are neighborhood status symbols. Moreover the likelihood of homeowners to misuse or misapply materials is great. On the other hand, many, if not all, states now require pest control applicators to be licensed to use *restricted* pesticides. Therefore these materials are not available to unlicensed home applicators! With, first, the loss of pesticide effectiveness through the buildup of resistance by pests (including disease organisms), second, the risk of unknown effects from a variety of toxic substances impinging on our environment, third, the economic consequences resulting from repeative applications, and fourth, the damage which sometimes has

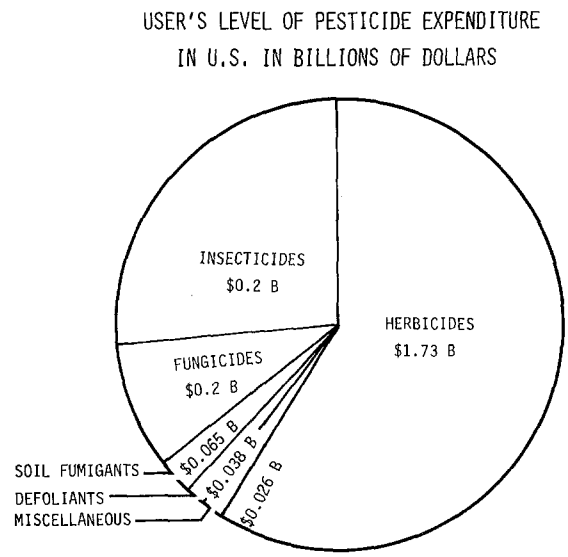

Figure 1. Estimated U.S. Sales of Pesticide at User's Level — 1980 (1978 dollars). From: A Look at World Pesticide Markets, Farm Chemicals, Vol. 142:61, September, 1979.

resulted from misuse, I believe an unbiased observer might admit that EPA has raised a valid point for urban IPM. If urban IPM programs can benefit the general welfare without imposing undue hardships on any group, then perhaps it is meaningful to pursue that mission.

How would such programs be implemented? In my short period of service, I noted discussions and dialogues between individuals and groups associated with different agencies. Working sessions were held to identify issues and resources, sometimes as a result of branch groups or individuals with common goals. Certainly within the EPA and USDA there is a spirit of cooperation. The USDA, through the Cooperative Extension Service, has started an urban gardening program in 5 states and through 4H programs in 3 other states. The U.S. Forest Service (USDA) through its Urban Forestry program has begun to teach about disease management which eventually should become part of an IPM package.

There is little question, then, that urban IPM is a high priority item within federal and state agencies. The National Academy of Sciences and the Council of Environmental Quality are contributing to assessing the needs. IPM received high priority

by the National Agricultural Users Advisory Board.

Although much scientific information on integrated pest management is already available, putting it into use will require time. The process will involve personnel in disciplines not normally thought to be associated with pest management. And more research to find answers to new questions will be needed. Fortunately, a delivery system for this information is already in place — the Land-Grant Institutions and their component Colleges of Agriculture with their Cooperative Extension Service. The research arm of these colleges, that is their agricultural experiment stations, can supply needed answers.

But one group which will and must make a sizeable contribution to developing any IPM program, be it rural or urban, is private enterprise at the local, regional, and national level. Through their research and development efforts, their management and sales capabilities, innovative industry and business can provide impetus. Many corporations will seize the opportunities to sell complete "packages or programs".

Polarization between the bureaucracy and private industry viewpoints must diminish if IPM programs are to move forward. Dale Wolf of duPont stated: "Industry's responsibility is to develop and test crop protectants to assure they will not damage the environment or health of users or eventual consumers of products." There must be less regulation and restriction by government on industry to perform in that context.

In any event, the view of urban IPM from "off the Hill" is that there appears to be a need, that the public is receptive to an environmentally yet economically sound concept and that it may be good management to get on with delivering the information to the consumer. Research and development can help tremendously by identifying needs, developing strategies, and filling data gaps to create dynamic packages for pest management in urban environments. This can be accomplished through cooperation of government, industry and academia.

The attached selected bibliography is not intended to be all-inclusive, but is provided for the reader who seeks more information on the subject of IPM.

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Contributed Abstract

Using preemergence herbicide combinations on deciduous nursery stock grown from softwood cuttings by W.D. Richards and W.D. Ward, Research Supervisor, Pacific Coast Nursery Inc., Route 1, Box 320, Portland, Oregon 97231 and Consulting Entomologist, Pacific Coast Nursery, Inc., Route 1, Box 320, Portland, Oregon 97231.

A trial was established at Pacific Coast Nursery Inc., Sauvie Island, on 5 deciduous tree varieties to determine the effectiveness of 2 granular preemergence herbicides. These materials were mixed for test purposes and used in combination on ornamental shade trees that were grown in the greenhouse from cuttings and transplanted in the test area on April 16, 1980. These plants were London planetree, 'October Glory' red maple, 'Red Sunset' red maple, 'Schlesinger' red maple, and 'Thundercloud' plum. The trees were planted in rows 4 feet apart on a 1 foot spacing and the treatments were applied in an 18 inch by 12 foot plot and were replicated 2 times for each variety. The herbicides applied to each variety were napropamide 10G at 4 lb ai/A plus oxadiazon 2G at 4 lb ai/A. The treatments were applied on May 12, 1980.

Initial observations on weed control and crop tolerance were taken on June 12, 1980 with 2 subsequent checks made on July 8, 1980 and August 6, 1980. The plots were given a visual rating from 0 to 10 for weed control and crop tolerance. The weeds observed were annual bluegrass, barnyard grass, mustard, yellow nutsedge, and water smartweed.

The napropamide 10G plus oxadiazon 2G combination proved to give fair to good weed control on everything except yellow nutsedge. Neither material is registered for use on yellow nutsedge. The napropamide seemed to be weak on complete coverage due to the high percentage of ai in the granular form. It is our opinion that the 10G formulation should be modified to a 2G or 4G formulation to overcome this problem. The crop tolerance to both materials was fair to good with no economic loss.

Treatment	*Rate*	*planetree*	*'October Glory'*	*'Red Sunset'*	*'Schlesinger'*	*plum*
napropamide 10G plus	4 lb ai/A plus					
oxadiazon 2G	4 lb ai/A					
weed control (broadleaf and grasses)		9.0	9.0	9.0	9.0	9.0
crop tolerance		1.2	2.2	2.0	2.1	1.0
check						
weed control (broadleaf and grasses)		3.0	3.1	2.0	2.5	2.2
crop tolerance		1.0	1.3	1.1	2.1	1.0

Control and crop tolerances are an average taken from 3 rating dates with 10 = total control or total crop kill.