



# Annual Report 1995

1995  
Annual Report of the  
Plant and Pest Diagnostic Laboratory

1155 LSPS  
Purdue University  
West Lafayette, IN 47907  
Tel: 317 494-7071  
Fax: 317 494-3958  
<http://www.aes.purdue.edu/ppdl/p&pdlwww.html>

The Plant and Pest Diagnostic Laboratory (P&PDL) at Purdue University is a multidisciplinary service laboratory staffed by diagnosticians from the departments of Botany and Plant Pathology, Entomology, Horticulture, and Agronomy. The mission of the P&PDL is to provide rapid and accurate identification of pests and problems associated with plants, as well as other types of vertebrate and invertebrate pests, and to provide specific controls recommended on a case by case basis. The P&PDL provides technical expertise to specialists and county extension educators of the Purdue University Cooperative Extension Service (CES) and the University's research and teaching faculty and staff, as well as routine pest and plant problem diagnoses for private businesses and citizens of Indiana.

## Table of Contents

|                                                                                                                                                                |    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| Staff . . . . .                                                                                                                                                | 3  |
| Laboratory Operations . . . . .                                                                                                                                | 4  |
| Overview of 1995 . . . . .                                                                                                                                     | 4  |
| Figure 1. Number of samples received per month by the P&PDL in 1995. . . . .                                                                                   | 5  |
| Figure 2. Turn-around time for samples received by the P&PDL in 1995. . . . .                                                                                  |    |
| Table 1. Fees assessed by the P&PDL in 1995. . . . .                                                                                                           | 6  |
| Table 2. Occupations of clientele submitting samples to the P&PDL in 1995. . . . .                                                                             | 7  |
| Figure 3. Distribution of samples received by the P&PDL from Cooperative Extension Service Offices in 1995. . . . .                                            | 8  |
| Figure 4. Distribution of samples received by the P&PDL directly from Indiana clientele rather than via Cooperative Extension Service Offices in 1995. . . . . | 9  |
| Figure 5. Distribution of samples received by the P&PDL from outside of Indiana. . . . .                                                                       | 10 |
| Table 3. Faculty and staff who have assisted with diagnoses for samples submitted to the P&PDL during 1995. . . . .                                            | 11 |
| Figure 6. Primary Diagnoses. . . . .                                                                                                                           | 12 |
| Table 4. Number of samples by commodity group and by problem type received in the P&PDL during 1995. . . . .                                                   | 13 |
| Advisory Committees . . . . .                                                                                                                                  | 14 |
| Educational Activities . . . . .                                                                                                                               | 15 |
| Highlights . . . . .                                                                                                                                           | 15 |

## Staff:

Tim Gibb served as interim director of the P&PDL until May of 1995, when Peggy Sellers was hired to serve as director. Full time staff for the Plant and Pest Diagnostic Laboratory consists of the director and the secretary, Janet Whaley. A 1/4 time graduate student extension assistantship with responsibilities to help with insect diagnoses was initiated in 1993, and continued through June of 1995. Corey Gerber was hired July 1, 1995 as a temporary technician to help with insect diagnostics. The laboratory also employs one or more student hourly workers throughout the year to help with sample distribution, filing, and other general duties in the laboratory.

Other people who act as diagnosticians for the P&PDL do so on a part time basis as a portion of their total commitment to their respective departments. Sylvie Brouder joined our team in October of 1995. Staffing responsibilities in the P&PDL and the department to which they belong are listed below

### Botany and Plant Pathology

|                                                                                      |                       |
|--------------------------------------------------------------------------------------|-----------------------|
| Director                                                                             | Peggy Sellers         |
| Secretary                                                                            | Janet Whaley          |
| Plant disease diagnosis and control                                                  | Gail Ruhl, Karen Rane |
| Weed identification, control, and<br>diagnosis of herbicide injury<br>on field crops | Dan Childs            |
| Computer support                                                                     | Robert Mitchell       |

### Entomology

|                                                           |                            |
|-----------------------------------------------------------|----------------------------|
| Invertebrate and other pest<br>identification and control | Timothy Gibb, Corey Gerber |
|-----------------------------------------------------------|----------------------------|

### Horticulture

|                                        |                 |
|----------------------------------------|-----------------|
| Identification of horticultural plants | B. Rosie Lerner |
|----------------------------------------|-----------------|

### Agronomy

|                                                       |                             |
|-------------------------------------------------------|-----------------------------|
| Fertility and soil related problems<br>of field crops | Dave Mengel, Sylvie Brouder |
| Turfgrass management                                  | Zac Reicher                 |

### Agricultural Research Programs

|                                     |              |
|-------------------------------------|--------------|
| Database programming and management | Terry McCain |
|-------------------------------------|--------------|

## Laboratory Operations:

County offices of the Cooperative Extension Service (CES) are provided with a supply of sample submission forms, alcohol vials, and mailing boxes to facilitate the submission of plant specimens and insects to the P&PDL. Sample forms are available to private businesses and citizens through CES offices, the P&PDL office, or the internet. Submission forms are filled out at the time a sample is brought to the laboratory or submitted by mail.

Information from the sample submission form is logged into the P&PDL computer database and the sample is assigned a unique number. Samples are then distributed to the appropriate diagnostician. If the diagnosis will require pathogen isolation or some other lengthy procedure (determined by the diagnostician), a preliminary reply, including a tentative diagnosis and projected final completion date, is returned to the client. When the diagnosis has been completed, the identification and control recommendations are entered into the database, printed, and the final response, along with any supporting information, is returned to the client and/or submitter. An electronic copy of the response is sent to the CES county office from which the sample originated, regardless of whether it was submitted through the CES office.

## Overview of 1995:

During 1995, the P&PDL diagnosed 4,131 samples, of which 1,112 were delivered personally to the office. In addition, 450 insect-related problems were diagnosed via telephone. Many other phone calls were handled by the staff of the P&PDL, but were not classified. In addition, extension bulletins or other printed information was included with 1,211 replies.

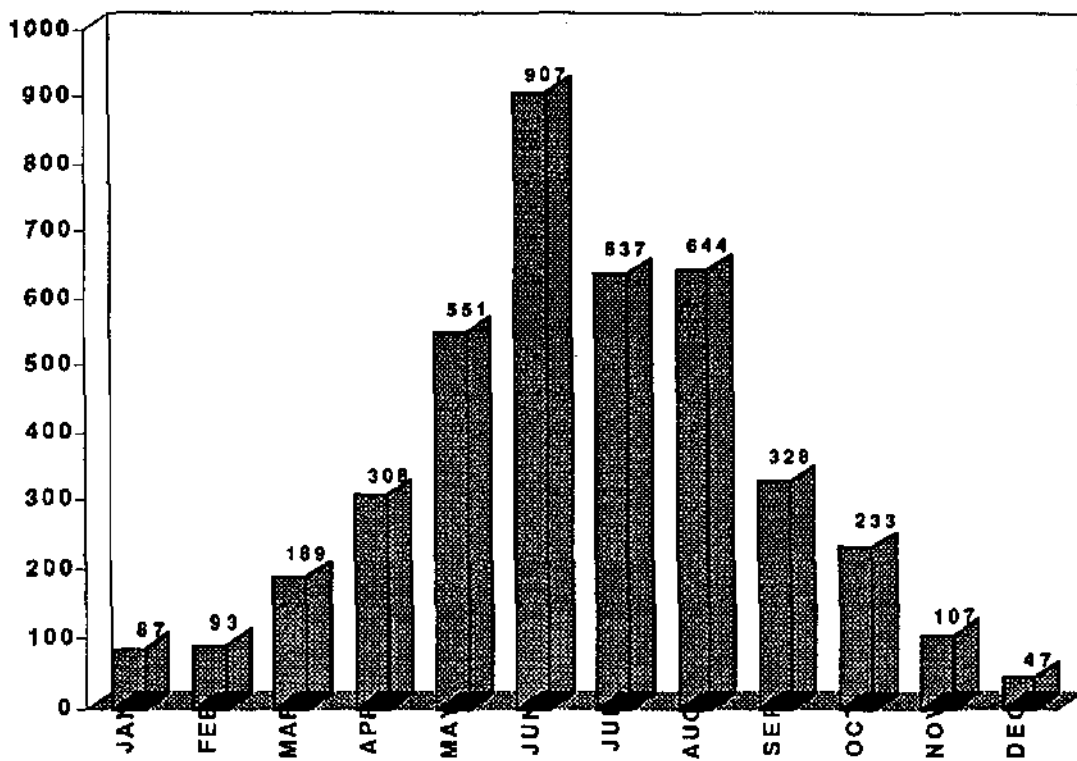
June, July, and August continue to be the months of greatest activity in the P&PDL based on number of samples received (Figure 1). During this period of time, nearly half of the year's samples are processed in the laboratory. One-half of the samples received during 1995 were completed in three days or less (Figure 2); 81% of the samples were diagnosed within five working days. Fees were assessed for only 6% of the samples received in 1995 (Table 1).

Most samples (56%) were submitted by Purdue University employees (Table 2). Cooperative Extension Service county educators from throughout Indiana submitted 47% of the samples; 9% were submitted by other university employees. Figure 3 shows the distribution of samples submitted via county CES offices, of which 34% were homeowner samples. The distribution of the remaining samples submitted to the P&PDL from other Purdue University employees, businesses and citizens of Indiana is shown in Figure 4. The P&PDL is primarily intended to serve residents of Indiana, however, diagnostic services were also provided to clients in 17 other states during 1995 (Figure 5).

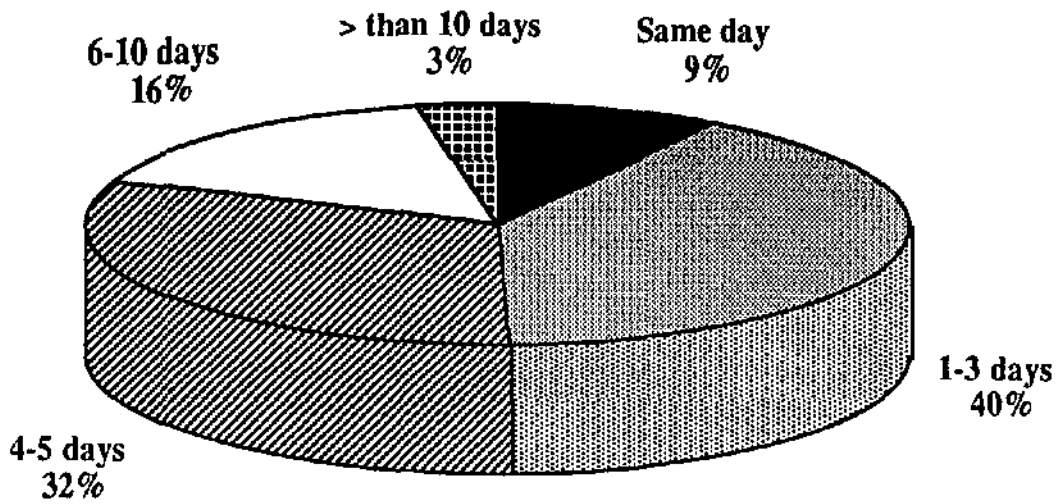
Due to multiple diagnoses per some samples, a total of 4,956 diagnoses were made by the P&PDL in 1995. These diagnoses were made primarily by the diagnosticians affiliated with the P&PDL (Table 3). Additional diagnostic expertise was provided by others in the School of Agriculture as well as outside the University. Noninfectious disorders (30%), infectious diseases (26%), and insect- or other arthropod-related problems (23%) were the most common primary diagnoses in 1995 (Figure 6).

Problems and questions dealing with trees and shrubs were the most common (34%) of those submitted during 1995, followed by agronomic crops (15%) and insects infesting homes and other buildings (9%). The remaining 27% were distributed between various commodity groups. The number and proportion of samples with abiotic, infectious diseases, and arthropod problems by commodity groups are presented in Table 4.

**Figure 1.** Number of samples received per month by the Plant and Pest Diagnostic Laboratory in 1995.



**Figure 2.** Turn-around time for samples received by the Plant and Pest Diagnostic Laboratory in 1995. Turn-around time is the number of working days between receipt of samples and date of final reply completion.



**Table 1.** Fees assessed by the Plant and Pest Diagnostic Laboratory in 1995.

| Service                         | Fee       | No. of Samples | Income         |
|---------------------------------|-----------|----------------|----------------|
| Routine diagnosis               | No charge | 3,870          | \$0            |
| Fungal/bacterial culture and ID | \$12.00   | 113            | 1,356          |
| Out of State                    | \$24.00   | 25             | 600            |
| Insect/plant/pest ID            | \$10.00   | 0              | 0              |
| Virus testing/ID                | \$25.00   | 115            | 2,875          |
| Out of State                    | \$50.00   | 8              | 400            |
| <b>TOTAL</b>                    |           | <b>4,131</b>   | <b>\$5,231</b> |

**Table 2. Affiliation of clientele submitting samples to the P&PDL in 1995.**

| Occupation            | Submitted by CES <sup>a</sup> |                | Submitted by public |           | Total <sup>b</sup> |            |
|-----------------------|-------------------------------|----------------|---------------------|-----------|--------------------|------------|
|                       | Number                        | % <sup>c</sup> | Number              | %         | Number             | %          |
| Consultant            | 4                             | * <sup>d</sup> | 88                  | 2         | 92                 | 2          |
| Dealer/Distributor    | 35                            | *              | 193                 | 5         | 228                | 6          |
| Extension (no client) | 120                           | 3              | ---                 | ---       | 120                | 3          |
| Farmer                | 263                           | 6              | 82                  | 2         | 345                | 8          |
| Garden Center         | 7                             | *              | 45                  | 1         | 52                 | 1          |
| Golf Course           | 4                             | *              | 13                  | *         | 17                 | *          |
| Greenhouse            | 30                            | *              | 148                 | 4         | 178                | 4          |
| Homeowner             | 1386                          | 34             | 644                 | 16        | 2030               | 49         |
| Landscaper            | 17                            | *              | 96                  | 2         | 113                | 3          |
| Lawn/Tree care        | 4                             | *              | 94                  | 2         | 98                 | 2          |
| Nursery               | 11                            | *              | 34                  | *         | 45                 | 1          |
| Other                 | 42                            | *              | 329                 | 8         | 371                | 9          |
| Pest control operator | 6                             | *              | 47                  | 1         | 53                 | 1          |
| Purdue/Not educator   | ---                           | ---            | 389                 | 9         | 389                | 9          |
| <b>Total</b>          | <b>1929</b>                   | <b>47</b>      | <b>2202</b>         | <b>53</b> | <b>4131</b>        | <b>100</b> |

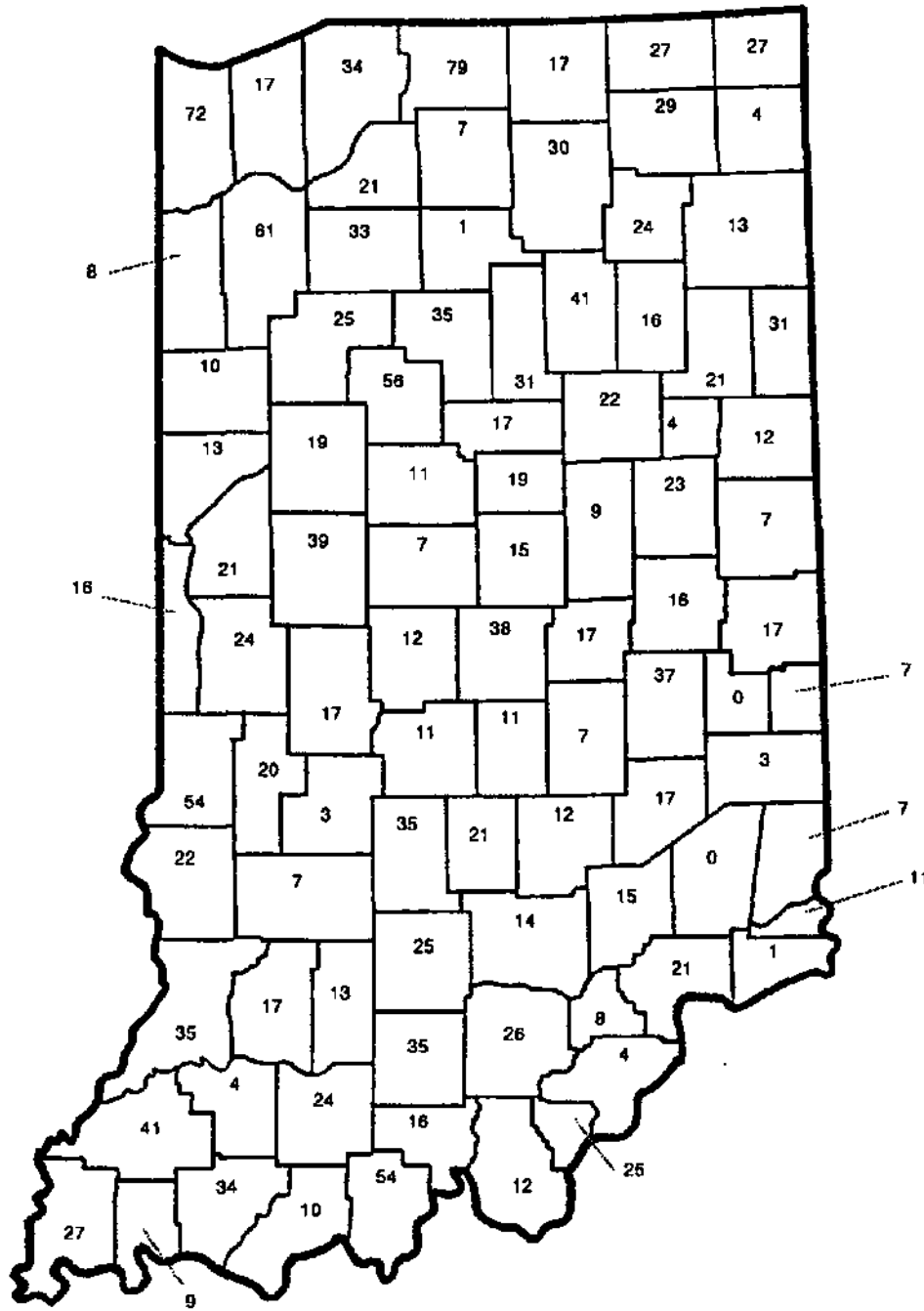
<sup>a</sup> CES = Cooperative Extension Service County Offices.

<sup>b</sup> These figures represent the sums of the first two columns (reading across).

<sup>c</sup> Percentage of total samples received (4131).

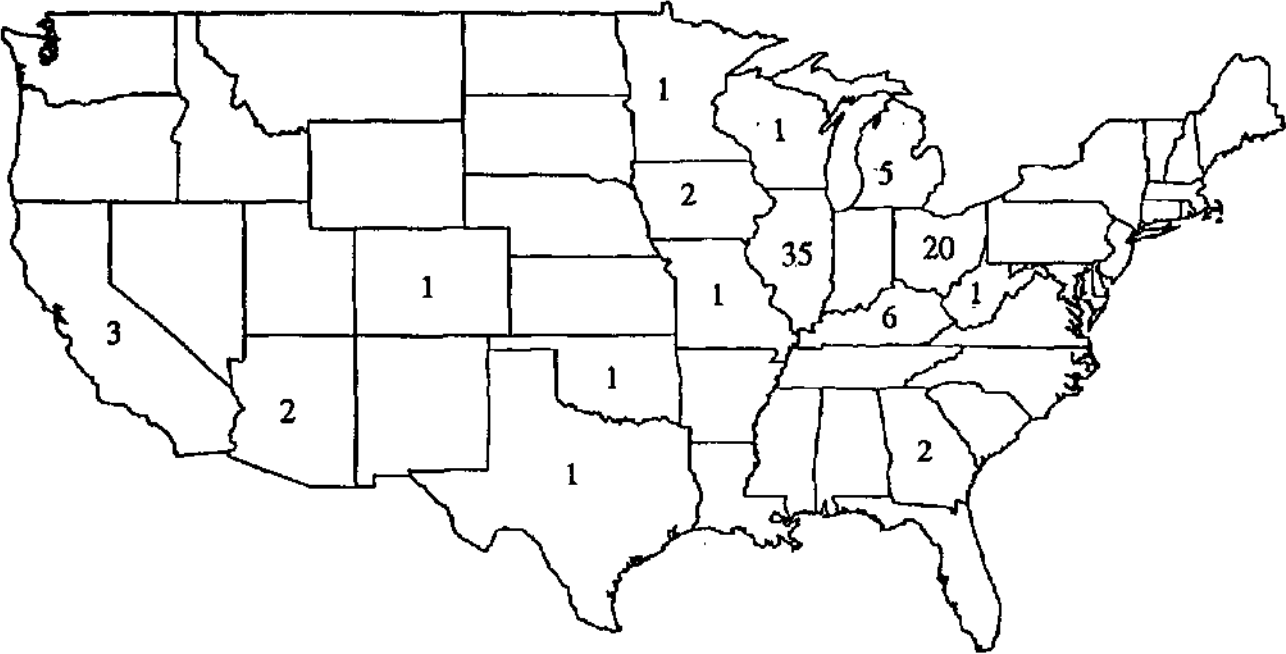
<sup>d</sup> Less than 1% of total number of samples received.

**Figure 3.** Distribution of samples received by the Plant and Pest Diagnostic Laboratory from Cooperative Extension Service Offices in 1995.





**Figure 5. Distribution of samples received from outside Indiana by the Plant and Pest Diagnostic Laboratory in 1995.**



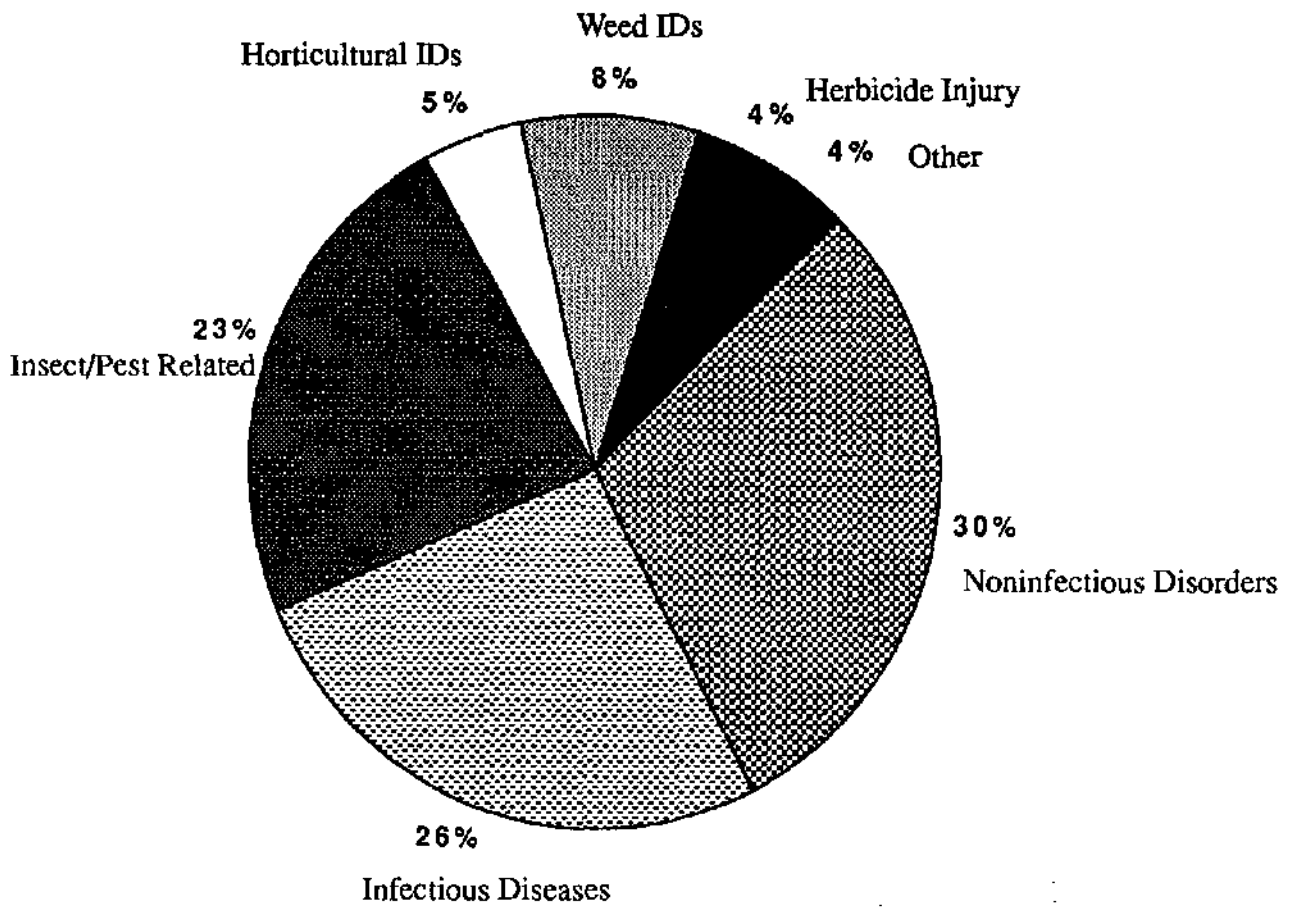
**Table 3.** Faculty and staff who have assisted with diagnoses for samples submitted to the *Plant and Pest Diagnostic Laboratory* during 1995.<sup>a</sup>

| Faculty/Staff                     | Number of Diagnoses | Faculty/Staff                         | Number of Diagnoses |
|-----------------------------------|---------------------|---------------------------------------|---------------------|
| <b>Agronomy</b>                   |                     | <b>Entomology</b>                     |                     |
| E. Christmas                      | 32                  | G. Brust                              | 2                   |
| S. Hawkins                        | 11                  | J. Ferris                             | 12                  |
| K. Johnson                        | 11                  | B. Corrigan                           | 1                   |
| <b>D. Mengel</b>                  | 71                  | <b>T. Gibb</b>                        | 73                  |
| R. Nielsen                        | 11                  | <b>C. Gerber</b>                      | 938                 |
| <b>Z. Reicher</b>                 | 113                 | J. Obermeyer                          | 1                   |
| C. Throssell                      | 10                  | C. Sadof                              | 2                   |
|                                   |                     | <b>Forestry and Natural Resources</b> |                     |
|                                   |                     | H. Holt                               | 1                   |
|                                   |                     | B. Miller                             | 2                   |
|                                   |                     | J. Senft                              | 2                   |
|                                   |                     | A. Spacie                             | 1                   |
| <b>Botany and Plant Pathology</b> |                     | <b>Horticulture</b>                   |                     |
| S. Abney                          | 5                   | B. Bordelon                           | 8                   |
| T. Bauman                         | 1                   | M. Dana                               | 102                 |
| <b>D. Childs</b>                  | 462                 | H. Flint                              | 1                   |
| R. Green                          | 8                   | P. A. Hammer                          | 18                  |
| J. Hennen                         | 2                   | D. Hayden                             | 1                   |
| D. Huber                          | 25                  | R. Joly                               | 1                   |
| T. Jordan                         | 13                  | <b>R. Lerner</b>                      | 233                 |
| R. Latin                          | 72                  | B. Moser                              | 7                   |
| C. Lembi                          | 8                   | J. Simon                              | 2                   |
| P. Pecknold                       | 52                  | S. Weller                             | 75                  |
| <b>K. Rane</b>                    | 1238                |                                       |                     |
| <b>G. Ruhl</b>                    | 1265                | <b>Other</b>                          |                     |
| D. Scott                          | 26                  | P. Dernoden                           | 2                   |
| <b>P. Sellers</b>                 | 45                  | L. Nees                               | 2                   |
| G. Shaner                         | 4                   | J. Loven                              | 4                   |
| G. Thorn                          | 10                  |                                       |                     |
| F. Whitford                       | 1                   |                                       |                     |
| C. Woloshuk                       | 1                   |                                       |                     |
|                                   |                     | <b>Total Diagnoses</b>                | <b>4,956</b>        |

<sup>a</sup> Total number of diagnoses = does not include telephone calls. The number of diagnoses exceed the total number of samples because of multiple problems/diagnoses per sample. More than one person may assist with a diagnosis.

<sup>b</sup> Names in bold type are designated diagnosticians associated with the P&PDL.

**Figure 6.** Proportion of primary problem types diagnosed by the Plant and Pest Diagnostic Laboratory in 1995.



**Table 4.** Number of samples by commodity group and number of primary diagnoses by problem type received in the Plant and Pest Diagnostic Laboratory in 1995.<sup>a</sup>

| Commodity           | Number of Samples <sup>b</sup> | % <sup>c</sup> | Abiotic Problems | Biotic Problems |            |
|---------------------|--------------------------------|----------------|------------------|-----------------|------------|
|                     |                                |                |                  | Diseases        | Arthropods |
| Animal/Human        | 59                             | 1              | 0                | ---             | 55         |
| Agronomic           | 632                            | 15             | 110              | 254             | 27         |
| Flowers             | 494                            | 12             | 197              | 202             | 32         |
| Fruits, small       | 89                             | 2              | 35               | 38              | 5          |
| Fruits, tree        | 162                            | 4              | 49               | 78              | 22         |
| Fungus              | 15                             | *              | 1                | 3               | ---        |
| Ground covers/Vines | 43                             | 1              | 7                | 14              | 2          |
| Home/Building       | 360                            | 9              | 1                | 2               | 353        |
| Interior plants     | 63                             | 2              | 39               | 10              | 11         |
| Other               | 29                             | *              | 0                | 0               | 0          |
| Pasture             | 43                             | 1              | 0                | 2               | 9          |
| Shrubs              | 247                            | 6              | 126              | 36              | 39         |
| Specialty           | 19                             | *              | 7                | 9               | 0          |
| Stored Foods        | 12                             | *              | 0                | ---             | 12         |
| Trees               | 1,171                          | 28             | 528              | 215             | 296        |
| Turf                | 212                            | 5              | 19               | 72              | 24         |
| Vegetables          | 322                            | 8              | 120              | 140             | 23         |
| (Not Classified)    | 159                            | 4              |                  |                 |            |

<sup>a</sup> Sample numbers do not equal the number of diagnoses because not all samples represented problems (e.g. horticulture plant and weed identifications, etc).

<sup>b</sup> Total number of samples of that commodity group.

<sup>c</sup> Percentage of samples, by commodity group, of the total number of samples (4131); \* = less than one percent.

### **Advisory Committees:**

The inter-departmental nature of the Laboratory demands frequent and free-flowing exchange of information among the participating departments. This communication takes place on at least three different levels.

**Steering Committee:** The P&PDL diagnosticians, director, and secretary meet once a week (or as needed) to discuss matters which relate to the daily operation of the Laboratory. Input from the diagnosticians is considered essential for smooth functioning of the Lab.

**Operations Committee:** Departmental extension representatives meet with the diagnosticians for discussion of operational matters and to facilitate communication among the specialists and diagnosticians of the participating departments.

**Members:** Peggy Sellers (Chair, Director, P&PDL), Ron Coolbaugh (Department Head, charged with administrative overview), Walt Beineke (Extension Forestry), Don Scott (Extension Plant Pathology), Mike Dana (Extension Horticulture), Cliff Sadof (Extension Entomology), Bob Nielsen (Extension Agronomy), as well as all members of the Steering Committee.

**Management and Policy Committee:** Recommendations from the Operations Committee and Steering Committee are carried to the Management and Policy Committee. The Management and Policy Committee provides administrative over-view for the Laboratory.

**Members:** Hank Wadsworth (Chair, Director of CES), David Petritz (Assistant Director of CES & Agriculture and Natural Resources), Eldon Ortman (Associate Director of Agriculture Research Programs), Bill McFee (Head, Department of Agronomy), Ron Coolbaugh (Head, Department of Botany and Plant Pathology), Chris Oseto (Head, Department of Entomology), Bruno Moser (Head, Department of Horticulture), Dennis LeMaster (Head, Department of Forestry), and Peggy Sellers (Director, P&PDL).

## **Educational Activities:**

**Newsletter:** The P&PDL newsletter, *Down the Garden Path*, was published 17 times during 1995, its fifth full year of issue. The annual subscription price for this nonprofit newsletter was \$15, and the number of paid subscriptions increased throughout the year, from 122 in January to 284 in December. A complimentary copy was also provided to each of the county CES offices. The goal of the newsletter was to bring timely information on current home, yard, and garden issues such as plant diseases, pests, weeds, and their management to consumer horticulturists.

**Electronic Update:** As a way of maintaining communication among CES county educators and specialists, a weekly electronic update was sent during the growing season. These updates included descriptions of the types of samples recently submitted, and suggestions for diagnosis and management. In addition, attempts were made to predict and provide suggestions for questions or plant problems that might be common throughout the state.

**Extension Activities:** The director (with additional help from other staff members) actively represented the P&PDL with a display during the Indiana State Fair, the Purdue University Agronomy Field Day and Turfgrass Day, the tri-state Farm Progress Show, the Vermillion County Fair, and various agronomic field days throughout the state. In addition, the display was present at the Purdue University Bug Bowl/Hort Day.

The director and other staff of the P&PDL gave presentations or workshops to a variety of audiences throughout the state. For example, some of the programs included County Educator Meetings, Master Gardener Programs, Turf and Ornamentals Workshops, Pesticide Applicator Training, Plant Science Workshop, 4-H Round-UP, Garden Center Personnel Training, Diagnostic Training Center, Certified Crop Advisor Training, and commercial grower and association meetings.

**Tour Groups:** The P&PDL hosted a variety of tour groups in 1995. Some of these groups included the Indiana Horticultural Society, a Polish Delegation, an Armenian Delegation, Certified Crop Advisors, and classes from Botany 301. In addition, several individuals toured the laboratory.

## **P&PDL Highlights:**

The Virtual Plant and Pest Diagnostic Laboratory, the P&PDL World Wide Web Home Page (URL: <http://www.aes.purdue.edu/ppdl/p&pdwww.html>) was put "on-line" in June of 1995. The creation of this web page was the result of "brainstorming" sessions among the P&PDL staff, and is maintained by Terry McCain. This has been a valuable educational tool that reaches not only the citizens of Indiana, but also the United States and the world. The page provides access to past issues of the Electronic Update for County Educators, several newsletters published by Purdue University including *Down the Garden Path*. There is also an "Ask our Expert" section. We have a keyword searchable database of past questions and answers, the current questions and answers (many include pictures), and a link to an email form so visitors can send questions to the lab. The staff of the P&PDL devoted a great deal of time addressing a charging policy that would help recover a portion of the operating expenses. A revised fee structure (\$11 per sample when originating from Indiana, \$22 outside of Indiana) was introduced in December with an implementation date of January 1, 1996.