information your reader needs to make a decision, meet a goal, or receive a timely update.

d. Be objective about what you saw and heard. Indicate when you quote someone as part of an interview.

e. Offer to answer any questions your reader may have about the trip and its outcomes.

f. Include any relevant financial information from your trip: expenses incurred, budget information or impact, etc.

TEST REPORTS

Much physical research (the discovery and documentation of facts) is communicated through short reports variously called **experiment, investigation, laboratory**, or **operations reports**. They all record the results of tests, whether the tests were conducted in a forest, computer center, laboratory, shopping mall, or soybean field. You may be asked to test an existing or a new product or procedure or verify certain physical or environmental conditions for a class or an employer. Figures 14.9 and 14.10 contain two test reports.

CASE STUDY

Two Sample Test Reports

Figure 14.9 (page 580) is a relatively simple and short test report in memo format regarding sanitary conditions at a hospital psychiatric unit. The report follows a direct and useful pattern of organization:

- statement of purpose—*why?*
- findings—*what happened?*
- recommendations—*what next?*

Submitted by an infection control officer, the report does not provide elaborate details about the particular laboratory procedures used to determine whether bacteria were present, nor does it describe the pathogenic (disease-causing) properties of the bacteria. Such descriptions are unnecessary for the audience (the housekeeping department) to do its job.

A more complex short test report can be found in Figure 14.10 (pages 581–583), which studies the effects of four light periods on the growth of paulownia seedlings (a flowering tree cultivated in China). The report, published in a scientific journal, is addressed to specialists in forestry and agronomy. Such a test report follows a different, more detailed pattern of organization than the report in Figure 14.9 and includes an informative abstract (see "Abstracts," pages 387–389), an introduction, a materials and methods section, a results and discussion section, and a conclusion.

To meet the needs of an expert audience, the writers of the report in Figure 14.10 had to include much more information than did Janeen Cufaude, the infection control officer who wrote the report in Figure 14.9, about the way the test was conducted and the types of scientific data the audience expects and needs. The researchers did not have to define technical terms for their audience, and they could confidently use scientific symbols and formulas as well.

FIGURE 14.9 A Short, Informal Test Report

Charleston General
HOSPITAL

Charleston, WV 25324-0114 / (304) 555-1800 / www.charlestongeneral.com

TO: James Dill, Supervisor
Housekeeping

FROM: Janeen Cufaude JC
Infection Control Officer

DATE: December 14, 2015

SUBJECT: Routine sanitation inspection, December 11, 2015

States why tests were performed and how

As part of the monthly check of the psychiatric unit (11A) on December 11, five areas were swabbed and tested for bacterial growth. The results of the lab tests of these samples are as follows:

Gives results of tests conducted in different locations

AREA	FINDINGS
1. cabinet in patients' kitchen	1. positive for 2 colonies of strep germs
2. rug in eating area	2. positive for food particles and yeasts and molds
3. baseboard in dayroom	3. positive for particles of dust
4. medicine counter in nurses' station	4. negative for bacteria—no growth after 48 hours
5. corridor by south elevator	5. positive for 4 colonies of staph germs isolated

ACTIONS TO BE TAKEN AT ONCE

Provides detailed directions based on results

1. Clean the kitchen cabinets with K-504 liquid daily, 3:1 dilution.
2. Shampoo rug areas bimonthly with heavy-duty shampoo, and clean visibly soiled areas with Safetec Sanizide Plus as often as needed.
3. Wipe all baseboards weekly with K-12 spray cleanser.
4. Mop heavily traveled corridors and access areas with K-504 cleanser daily, 1:1 dilution.

FIGURE 14.10 A Test Report Published in a Scientific Journal

Paulownia Seedlings Respond to Increased Daylength

M. J. Immel, E. M. Tackett, and S. B. Carpenter

Abstract

Paulownia seedlings grown under four photoperiods were evaluated after a growing period of 97 days. Height growth and total dry weight production were both significantly increased in the 16- and 24-hour photoperiods.

Begins with informative abstract

Introduction

Paulownia (*Paulownia tomentosa* [Thunb.] Steud.), a native of China, is a little known species in the United States. Recently, however, there has been increased interest in this species for surface mine reclamation (*1*).* Paulownia seems to be especially well adapted to harsh micro-climates of surface mines; it grows very rapidly and appears to be drought-resistant. In Kentucky and surrounding states, paulownia wood is actively sought by Japanese buyers and has brought prices comparable to black walnut (*2*).

This increased interest in paulownia has resulted in several attempts to direct seed it on surface mines, but little success has been achieved. The high light requirements and the extremely small size of paulownia seed (approximately 6,000 per gram) may be the limiting factors. Planting paulownia seedlings is preferred; but, because of their succulent nature, seedlings are usually produced and outplanted as container stock rather than bareroot seedlings. Daylength is an important factor in the production of vigorous container plants (*5*).

Our study compares the effects that four photoperiods—8, 12, 16, and 24 hours—had on the early growth of container-grown paulownia seedlings over a period of 97 days.

Gives background, purpose, and scope of study

Materials and Methods

Seeds used in this study were stratified in a 1:1 mixture of peat moss and sand at 4°C for 2 years. Following cold storage, seeds were placed on a 1:1 potting soil–sand mix and mulched with cheesecloth. They were then placed under continuous light until germination occurred. Germination percentages were high, indicating paulownia seeds can survive long periods of storage with little loss of viability (*3*).

Thirty days after germination, 3- to 4-centimeter seedlings were transplanted into 8-quart plastic pots filled with an equal mixture of potting soil, sand, and peat moss. Seventy-five seedlings were randomly assigned to each of the four treatments. Treatments were for 4 photoperiods—8, 12, 16, and 24 hours—and were replicated three times in 12 light chambers. Each chamber was 1.2- by 1.2-meters with an artificial light source 71 centimeters above the chamber floor.

Describes steps taken: procedures, conditions, and equipment used

The light source consisted of eight fluorescent lights: four 40-watt plant growth lamps alternated with four 40-watt cool white lamps. Light intensity averaged 550 foot-candles (1340μ einsteins/m^2/s) at the top of each pot and the temperature averaged 550 foot-candles (1340 einsteins/m^2/s) at the top of each pot and the temperature averaged 23°C (+2°C).

Seedlings were watered and fertilized after transplanting with a 6-gram 14-4-6 agriform container tablet. Beginning 1 month after transplanting, two seedlings were randomly selected and harvested from each chamber for a total of 24 trees.

Uses technical terms and symbols audience expects

*To save space, the references have been omitted.

(Continued)

FIGURE 14.10 (Continued)

Height, root collar diameter, length of longest root, and oven-dry weight (at 65°C) were determined for each seedling. Harvests continued every week for 5 additional weeks.

Results and Discussion

Results indicate that early growth of paulownia is influenced by photoperiod, as shown in Table 1 below:

Includes a visual to summarize results and then explains what happened

TABLE 1. Height Diameter, Root Length, Total Dry Weight, and R/S Ratio for Paulownia Seedlings Grown Under Four Photoperiods After 97 Days.

Photo period (hrs.)	Height (cm)	Diameter (cm)	Root length (cm)	Total dry weight (gm)	R/S ratio
8	13.1	0.48	16.0	1.65	0.18
12	17.8	0.67	34.7	7.27	0.32
16	27.3	0.93	31.1	15.92	0.39
24	29.2	0.90	43.9	18.66	0.33

Expanding the photoperiod from 8 to either 16 or 24 hours increased height growth by 100 percent. Height growth in the 12-hour treatment also increased, but did not differ significantly from the 8-hour treatment. Heights under photoperiods of 8, 12, 16, and 24 hours were 13.1, 17.8, 27.3, and 29.2 centimeters, respectively.

Cites related studies

Previous studies have also shown that photoperiod affects the growth of paulownia seedlings (*4*, *6*). Sanderson (*6*), for example, found that paulownia seedlings grown under continuous light averaged 27.2 centimeters in height after 101 days compared with 29.2 centimeters for our 24-hour seedlings. Other corresponding photoperiods were equally comparable. Downs and Borthwick (*4*) also concluded that height growth of paulownia was affected by extending the photoperiod.

Provides accurate measurements in a clear, objective tone

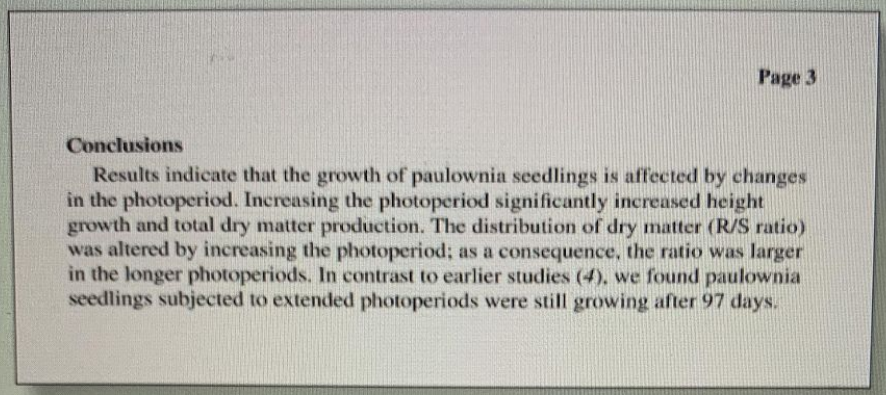
The great treatment differences were shown in total dry weight production. Refer again to Table 1. The mean weight of 1.65 grams for seedlings in the 8-hour treatment was significantly less than that of any of the other photoperiods. The 16- and 24-hour treatments did not differ significantly. In fact, they more than doubled the average weight for seedlings in the 12-hour treatment.

Root-to-shoot ratio (R/S) indicates the relative proportion of growth allocated to roots versus shoots for the seedlings in each photoperiod. In this study, shoots were developing at nearly three times the rate of the roots for seedlings in the 12-, 16-, and 24-hour treatments.

The 0.18 R/S ratio for seedlings in the 8-hour treatment was much lower, indicating that relative growth of the shoot is approximately five times that of the root. The shorter photoperiod, therefore, decreased root development relative to shoot development as well as significantly reduced total dry weight production.

Although root collar diameter and root length did not significantly differ under the different photoperiods after 97 days, there was a trend for greater diameter and root growth when exposed to longer photoperiods.

FIGURE 14.10 (Continued)



Page 3

Conclusions

Results indicate that the growth of paulownia seedlings is affected by changes in the photoperiod. Increasing the photoperiod significantly increased height growth and total dry matter production. The distribution of dry matter (R/S ratio) was altered by increasing the photoperiod; as a consequence, the ratio was larger in the longer photoperiods. In contrast to earlier studies (*4*), we found paulownia seedlings subjected to extended photoperiods were still growing after 97 days.

Interprets the significance of the results

Adapted from M. J. Immel, E. M. Tackett, and S. B. Carpenter, "Paulownia Seedlings Respond to Increased Daylength," *Tree Planters' Notes* 31(*1*): 3–5. United States Department of Agriculture, Forest Service.

Objectivity and accuracy are essential ingredients in a test report. Readers want to know about your empirical research (the facts), not about your feelings. Record your observations without bias or guesswork in a laboratory journal, log book, or electronically and always document the results with precise measurements using the standard symbols and abbreviations of your profession.

Questions Your Test Report Needs to Answer

Readers will expect your test report to supply the following information:

- why you performed the test—an explanation of the reasons, your goals, and who authorized you to perform the test
- how you performed the test—under what circumstances or controls you conducted the test, what procedures and equipment you used, etc.
- what the outcomes were—your conclusions
- what implications or recommendations follow from your test—what you learned, discovered, confirmed, or disproved or rejected

When you sign the final copy of your report, you certify that things happened exactly when, how, and why you say they did.