

Colby College Integrated Pest Management Plan

Purpose and Goals

The physical campus is the first impression visitors and prospective students have of the College and it is a critical asset. The beauty of the campus is the well maintained grounds and buildings, along with academic strengths such as the quality of the faculty, are among the most often cited reasons for students who enroll at Colby. Equally important is the need to provide a quality indoor and outdoor environment in which the faculty, staff, and students can live, work, and learn. We are responsible for ensuring that these strategic assets are protected, maintained, and enhanced, and that we strive to do so in a sustainable and environmentally responsible manner. These policies and procedures have been developed with these goals in mind.

Policy Statement

Colby College employs an Integrated Pest Management Program (IPM) as a sustainable approach to controlling invasive species, insects, weeds, plant pathogens, and other pests through the use of biological, physical, and, as a last resort, chemical methods. This approach minimizes the risk from pesticides to human health and the surrounding environment. This plan may change over time as approach and reporting practices used on campus are updated. Those changes will be formalized by revisions to this written plan and will be identified by a plan revision number and date on the cover sheet of the document.

The IPM program utilizes a system of regular pest scouting and maintenance of the grounds and buildings, along with appropriate selection methodologies, to minimize both the quantity and toxicity of chemicals on campus. Colby follows these general principles:

- Conduct regular scouting of plant resources and buildings for early detection of invasive plants, pests, and other potential problems to minimize the scale of possible treatment.
- Actively implement preventative and cultural practices in order to minimize or eliminate chemical treatments.
- Use only knowledgeable and licensed professionals for chemical applications that are used as a last resort. Any chemical applications are evaluated on an ongoing basis in order to limit their use and best understand their effectiveness. Any required treatments are scheduled to minimize their impact on campus activities.

The IPM program addresses five major campus use categories:

- (1) Turf and Grasses
- (2) Trees and Woody Ornamentals
- (3) Buildings
- (4) Greenhouse Facilities
- (5) Woodlands

All areas follow the same general principles; however, steps taken are adjusted to reflect the unique issues related to each area.

Communication

Communication is paramount to the successful execution of an IPM plan. Both Facilities and Campus Planning (Facilities) and Dining Services have established departmental IPM management members to oversee implementation of the campus IPM Plan. If any other departments believe they have a need to use pesticides (whether organic or non-organic), they must coordinate with the IPM management team. The IPM management team consists of:

- a) Assistant Vice President for Facilities and Campus Planning
- b) Assistant Director for Grounds and Custodial Services
- c) Grounds Supervisor
- d) Environmental Programs Manager/Campus Horticulturalist
- e) Associate Director of Dining Services
- f) Director of Sustainability
- g) Environmental, Health, and Safety Director
- h) Biology Lab Instructor / Greenhouse Manager
- i) Two Student Representatives

The team will meet on a regular basis as described in the "Annual Management Schedule for IPM" (see Attachment A). In these meetings the IPM plan will be reviewed, pest information profiles will be updated, and new options will be discussed.

Information will be passed along to the College community by use of the general announcements and the Facilities website to inform faculty, staff, and students when an exterior pesticide application will be made. Re-entry signage at regular intervals shall be posted prior to the application and used immediately after the application to allow for adsorption of the chemical to the plant or soil surfaces. For interior building treatments, building occupants will be notified at least 24 hours in advance of scheduled treatments, except in the case of stinging insects. In that case, notification will be made to building occupants giving as much notice as possible before treatment. The notices, along with the scheduled date of treatment, will include the product name, its EPA registration number, and the campus location of the application. Least-risk pesticides, or those listed on the San Francisco Tier II Least-Risk list, do not require notification.

Facilities, Dining Services, and the Greenhouse will each maintain a log book which contains information pertaining to pest problems and how they have been remedied. More detail is provided in the Recordkeeping section of this document.

Minimizing Pesticide Use

To help minimize the need for pesticides on campus, Colby College employs multiple cultural methods and practices to help accomplish this standard.

Examples of such activities relative to campus turf include: efficient use of fertilizers; adjusting mower heights to minimize weeds; adjusting mowing frequency to minimize grass damage; managing irrigation timing to improve growth during periods of drought; choosing grass varieties suitable for this climate and location(s); regular soil aeration, dethatching and topdressing; slice seeding where grass stands have been compromised; natural soil improvements to help grass better compete with weeds and other pests; and mechanical removal of pests whenever possible.

Cultural practices and methods for woody ornamentals and trees include: pruning of diseased, dead and over growth branches and limbs; managing frequency of irrigation to best benefit a particular plant; complete removal of dead or dying trees/woody ornamentals; removal of invasive exotics and replacing

with native or naturalized species; composting and fertilizing for plants under stress and mechanical removal of pests.

Pest control of our buildings consist of: maintaining clean and moisture free environments on the interior of our buildings; building maintenance and repairs to limit access for pests; maintenance and repairs to remove potential homes for pests; cleaning and proper storage of items that could be a food source for pests; mechanical traps; glue traps; and vector fly lights or similar attractants.

In the campus woodlands, we will make a yearly physical review looking for exotic invasive plants, shrubs and trees as identified by the Maine Department of Environmental Protection. If possible, we will remove that plant(s) and its root system.

Identification of Pests

For each pest that has been encountered in the recent past, or that has a likelihood of impacting the College in the future, a Pest Profile Sheet will be maintained. Pest information profiles are written, maintained, and kept on the facilities website as well as the log book located at the front desk of the Facilities building and at Dining Services. Pest information includes common name, scientific name, species affected, brief description of symptoms or key diagnostic features, biology/life cycle, favorable environmental conditions, scouting program, and threshold levels. The profiles are a compilation of existing information and will be reviewed at least annually and updated as new information becomes available.

Pest and Invasive Plants Scouting / Inspection Program

Pest/invasive plant scouting and inspection program are critical to the success of the College's IPM Plan. Colby College must know which pest(s) are presently on the campus or what pest/invasive plants are of concern based on history, environmental conditions, weather, or building condition.

For turf and grasses, during the growing season, the scouting frequency will be a minimum of once per month and will be increased as dictated by weather or when pest/invasive plant populations require closer monitoring. Records of scouting and pest populations (when identified) will be maintained by Facilities and kept in the Grounds Supervisor's office. Scouting results and pest/invasive plants population trends will help to better determine if a pesticide application is necessary or if specific control options are working satisfactorily. All scouting and inspections will be reviewed with the IPM committee.

For woody ornamentals and trees including woodlands the scouting program can be broken down into three general time frames. Each of these time frames are dependent upon weather and is unpredictable in both nature and timing. The three times frames are made up of (a) pre-bud break in early spring, (b) bud break in late spring to early summer, and (c) early fall before dormancy. The scouting will produce evidence as to what levels of pest/invasive plants, if any, are present as well as whether the pest/invasive plants in question is detrimental to the existing plant inventory on campus. All scouting and inspections will be reviewed with the IPM committee.

For buildings the scouting/inspection program includes several components:

- (a) The College contracts with a licensed Pest Control Company to provide regular inspections of campus buildings. During the months of April through October of each year, when potential for pest problems is greater, the company will make weekly visits to camps to respond to customer issues, inspect most susceptible areas, and follow up on previous inspections and/or treatments. During the months of November through March of each year, they will be on campus bi-weekly to perform the same services.
- (b) Employees, particularly those in the custodial and dining services areas, regularly inspect the interior of buildings for cleanliness and possible pest control issues. When evidence of pests is observed, they notify the Facilities main office so that the pest control company can follow up. Facilities employees, particularly those in the grounds crew, regularly inspect the exterior of buildings noting any evidence of pests. When evidence of pest are observed, they notify the Facilities main office so that the pest control company can follow up
- (c) Customers, the primary users of their spaces, are key in identifying potential pest problems. When a customer reports a concern to Facilities, the first step is to confirm the nature of the problem. This is most often done by a visual inspection performed by Facilities or the pest control company and/or by the use of glue boards or other trapping devices that can help to identify the nature of the pest.

All findings are reviewed with the IPM committee.

For the Greenhouse facility, the scouting and inspection program starts with effective plant care and facility maintenance. Abiotic stressors leave plants more susceptible to insects, mites, and fungal diseases. Plant care needs, notably light, soil, water, nutrient, and specific cultural requirements will be compiled and stored online for easy access by all greenhouse workers. Proper facility maintenance, such as keeping benches and floors free of plant debris, limiting plant introductions, and preventing crowding will reduce sources of pests and eliminate pest harbors.

Prioritizing Campus

The campus Landscape Master Plan identifies five character zones as significant to the campus landscape structure. As identified in Attachment B, they include:

- Campus Core
- Greensward
- Hillside
- Meadow and Playing Fields
- Woodland

These character zones, as well as other campus concerns, are taken into consideration in establishing priority zones for IPM. Thresholds for each zone are included in the Pest Profile sheets.

Turf and Grasses

Type A These areas will be managed to minimize any reduction to their quality. These areas will receive the most significant attention and resources. Type A turf areas include:

- a) The Campus Core
- b) Varsity Athletic fields

Type B Minor pest problems will be acceptable in these areas and will require less maintenance, but will need to be regularly reviewed as these zones are potential host locations for problems that can progress into our Type A areas. Type B turf areas include:

- a) The Greensward zone
- b) Practice athletic fields
- c) Hillside zone

Type C. Pest problems will be monitored, but the College will treat only the most serious of pest and plant invasives problems that could spread to other zones. Type C turf areas include:

- a) Meadow areas within the Meadow and Playing Fields zone
- b) Woodland zone

Woody Ornamentals and Trees

Type A This area includes trees and shrubs in the Campus Core, Greensward, and Hillside zones. Since the majority of adult trees are approximately the same age of maturity in this zone, we need to be very diligent with their maintenance. Other factors such as ledge profile, soil type, and heavy foot traffic put these trees at greater risk to disease and other pests.

Type B Type B areas include trees and shrubs in the Meadow and Playing Fields zone. These areas are less formal and will require less maintenance, but will need to be regularly reviewed as these areas are potential host locations for pest problems that can progress into Type A areas.

Type C includes the undeveloped Woodland zones that surround the campus. They are largely natural and require little maintenance; however, they bare watching for indicators of pest problems or exotics that could spread to other zones.

Buildings

The levels below provide thresholds for pests that dictate a particular response from Facilities. Pest profile sheets include a pest's categorization level.

Type A areas are considered an immediate risk and include the following:

- a) Stinging insects or other pests that pose an immediate danger to the health and safety of staff or students.
- b) Pests in a food service area.

Type B areas are considered a high risk and include the following:

- a) Pests that pose a health issue to staff or students that may not be immediate, but is significant.
- b) Pests that pose a risk to the structural integrity of the buildings.
- c) Nuisance pests that, although they may pose no significant health risk or risk to the building's structural integrity, are evident in such large numbers as to negatively impact daily operations or quality of life.

Type C is considered a lower risk and includes the following:

- a) Nuisance pests in smaller numbers that pose no significant health risk or risk to the building's structural integrity and that do not cause a significant negative impact on the living, learning, or working environment.

Greenhouse Facilities

Due to the ecology of greenhouse environment, especially when maintaining plants in conservatory settings, pest outbreaks are an unfortunate occurrence. Extension publications on the identification of common greenhouse pests: aphids, thrips, whitefly, spider mites, scale, mealybugs, and fungus gnats, and their associated symptoms will be stored online for access by all greenhouse workers.

When pests have been found, action thresholds will vary by zone, plant value, and type of infestation. Priority will be given to cultural, then biological, then chemical control, if possible. Biological control is effective at keeping some pests in check, but is limited by the predator-prey dynamic of ecology. Once the problem is eliminated, the predators die, and new pests are able to colonize the space. All activities will be logged.

- a) **Type A** – Research areas: Olin West bay and Olin Environmental Chambers. All plants and parts are assumed to be essential. Initial discussion with researcher will determine if cultural and biological controls are acceptable for certain pests.

Chemical Action Threshold - 1 plant.

- b) **Type B** – Teaching and Conservatory areas: Arey greenhouse, Olin Center bay, Olin East bay, and the Babson Skyway 2nd and 3rd floor hallways.

All plants are assumed non-essential. Infestations of common greenhouse pests will be primarily dealt with through cultural controls. At the end of scouting, infested plant parts will be pruned back, syringed, or pests manually removed. Consultation of plant care requirements will follow and alterations made to limit the problem in the future. These same tactics will apply for unidentified pests; however, after cultural control the pest will be identified, kept on file, and the appropriate control/plant care measures taken. Action will be repeated until the infestation has been eliminated or has increased in severity.

Biological control will be undertaken for any slowly spreading or non-localized infestation of common greenhouse pests. Pest identification beyond common type (e.g., brown soft scale) required before application to ensure correct biological agent is applied. Follow-up applications scheduled as recommended by vendor.

Chemical Action Threshold – 1 heavily infested plant (Tier III only), greater than 5 square feet of a single bench, quickly spreading infestation of whitefly or spidermites, or 30% of the zone.

Selection Criteria

When the results of scouting or inspections indicate a pest or invasive plant meets the threshold for treatment, non-chemical methods must first be considered and implemented (unless there is a severe health threat) before chemical treatments are employed. Each identified campus pest has a pest profile sheet that lists the appropriate non-chemical methods to use first. The list is organized in a sequential manner. Based on the success of the non-chemical methods, Colby staff will adjust their approach for a pest on a case by case basis. In all exercises, a chemical treatment represents a last resort option except for pests that pose a threat to human health or impact the structural integrity of campus buildings.

Each individual area around the Colby College campus has unique characteristics such as proximity to ledge, parking areas containing impervious surfaces, soil types, grades and slopes, building materials, building age, proximity to wetlands or other water sources, and use/function of the area. Consideration must be given to these special site or building characteristics when choosing the appropriate control measure.

Chemical Application Protocol

If non-chemical measures have not been successful as outlined in the Pest Profile sheet, then chemical measures may be employed.

First, Colby has committed to limiting the use and application of the 30 pesticides listed at the website below. Presently, Colby uses only four of the pesticides listed in this document in extreme circumstances. These four pesticides are: 2,4 D; Pendimetalin; Bifenthrin; and Fipronil. For reference, this list has been included in Attachment C of this document and may also be found online at: <http://www.beyondpesticides.org/assets/media/documents/lawn/factsheets/30health.pdf>

Further, Colby commits to cease the use and application of all neonicotinoids on campus. These pesticides specifically are known to cause environmental harm to pollinators and have been linked to the decline of bee populations. In response, Colby College also commits to the following:

- In order to limit the use of neonicotinoids upstream, the College commits to purchase plants for campus landscaping that, to the best of our knowledge, have not been pre-treated with neonicotinoids. This commitment will also be reflected in purchasing and campus construction standards that neonicotinoids or plants pre-treated with neonicotinoids may not be used on Colby's campus.
- Beginning in the summer of 2016 will not use imidacloprid, clothianon, thiamethoxam, dinotefuran, and acetamiprid on campus.
- As needed, ensure any substitutes for neonicotinoids used on campus are safer for pollinators.

In addition, Colby uses the following references and guidelines to assist in selecting the most appropriate chemicals for the problem being addressed.

- a) **National Organic Program** as administered by the U.S Department of Agriculture. (This program is also referenced on MOFGA web site)

The College will give preference to effective chemicals that bear the NOP logo or are

approved on "The National List of Allowed and Prohibited Substances".

- b) **Windows Pesticide Screening Tool (WIN-PST)** as published by the U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS).

The College will compare options for pesticides that are effective on the problem being addressed and select the chemical that has the lower rating in toxicity categories.

In the category of Human toxicity (EATHuman), the College will strive to use only chemicals that are rated as "very low", "low" or "intermediate".

- c) **Signal Word Labeling** as identified by Environmental Protection Agency.

The College will strive to use chemicals that are labeled as "caution", rather than "warning" or "danger".

Colby College is committed to limiting and reducing our use of chemicals. They are used to manage pests after thresholds have been surpassed and other preventive methods have failed. This includes the use of smaller amounts of chemical as a preventative measure to minimize the potential for a more significant curative application at a later date. The following additional safety measures must be incorporated into any chemical application process.

- 1) Pest information profiles will be consulted to achieve proper timing of chemical applications and proper post treatment of the application area.
- 2) Lowest recommended rates that achieve control will be used.
- 3) Spot treatment of pest areas as opposed to blanket applications will be used.
- 4) When appropriate, use a tackifier to enhance chemical contact and reduce runoff potential.
- 5) Untreated buffer areas will be utilized to minimize runoff.
- 6) Prior to all pesticide applications the following will be reviewed:
 - i) Unique characteristics for the affected area, including those identified previously in this policy, will be analyzed and understood.
 - ii) Chemical labels and SDS will be available, read, and understood.
 - iii) Safety issues will be reviewed with the applicator. Proper protective gear will be used.
- 7) Supplies for containing a chemical spill must be maintained and available for immediate use by the applicator.
- 8) Training sessions will be scheduled regularly for appropriate personnel in the areas of chemical awareness and pesticide guidelines.

Colby Personnel

The Colby College Grounds Supervisor will be licensed with the state of Maine as a Master Commercial Applicator - Category III(a) and III(b).

The Biology Greenhouse Manager must have a Master Commercial Applicator License from the State of Maine in the Core, 1B Agricultural Plant, and 3C Indoor Ornamental categories. They will be responsible for applications of pesticides on the Type III Limited Risk List and those with Caution signal word only. Pesticides will be self-selected to limit hazard to all greenhouse users, visitors, and workers. Follow-up applications will be made using pesticides with different modes of action to prevent resistance from building in greenhouse populations. As a last resort if cultural, biological, and limited hazard pesticide controls have not reduced the infestation to acceptable thresholds, contracted pesticide applicators will be apply products with signal words above Caution, in accordance with the procedures outlined in this policy.

All other applicators for Colby College will be licensed with the state of Maine in the appropriate category for which they are treating.

Colby Contractors

When working on campus, contracted pesticide applicators must follow the procedures outlined in this policy. Further, it is preferred that all pesticide applicators are a GreenPro, Ecwise, or Greenshield Member. If certification is not possible, the College requires that the applicators comply with the standards outlined in these certifications. Chemical treatments may only be applied with approval of one of the members of the IPM team.

Recordkeeping

Facilities, Dining Services, and the Greenhouse will each maintain a log consisting of this Integrated Pest Management Plan and a written record of IPM activities conducted throughout the year. The records must be kept for a period of two years. This information will include, at a minimum,

- 1) Pest problems encountered
- 2) Non chemical options implemented
- 3) Chemical options implemented (MSDS/SDS for the chemicals will be stored by the Environmental, Health, and Safety Director online and you can find them on Colby's Human Resources Safety Office website page)

Metrics and Plan Compliance

As a means to demonstrate plan compliance, measure performance, and identify ways for continuous improvement, the IPM team has committed to the following. On an annual basis, the IPM team will gather and review the following information:

- a) Total pest issues
- b) Number of chemical treatments
- c) Comparison of chemical applications to non-chemical measures
- d) Comparison of organic applications to inorganic applications
- e) Inclusive of the data above, provide adjusted metrics for the above after accounting for stinging insects, or highly harmful or destructive pests

Annual Review of IPM Program

In accordance with the Annual Management Schedule, the IPM team will conduct an annual review of this Integrated Pest Management Plan. The plan will be maintained by Facilities and will be modified or adjusted as needed to better accomplish the goals of Integrated Pest Management on campus. The plan, as set forth in this document, is subject to change based upon new information about current programs or pests, as well as the availability of new, more environmentally sensitive products or procedures.

Summary

Colby's facilities are a significant and critical asset for the College. Colby is committed to being environmentally responsible while still maintaining a healthy and attractive landscape; as well as a quality environment in which the faculty, staff and students can live, work and learn.

Approved:

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ATTACHMENT A

Annual Management Schedule for IPM

March

IPM team meets

- Review Pest profile sheets and update as required
- Review IPM plan and modify as needed

April

IPM team meets

- Review March Activities
- Discuss new alternative chemicals or treatments available
- Discuss campus concerns/ plans for spring season

June

IPM team meets

- Discuss results of scouting
- Follow up on April meeting
- Discuss campus concerns/plans for summer season

August

IPM team meets

- Discuss results of scouting
- Follow up on June meeting
- Discuss campus concerns/plans for fall season

October

IPM team meets

- Annual review of yearly activities

ATTACHMENT C

30 Commonly Used Pesticides

A Beyond Pesticides Factsheet – A Beyond Pesticides Factsheet – A Beyond Pesticides Factsheet – A Beyond Pesticides Factsheet

Health Effects of 30 Commonly Used Pesticides

	Health Effects						
	Cancer	Endocrine Disruption	Reproductive Effects	Neurotoxicity	Kidney/Liver Damage	Sensitizer/Irritant	Birth Defects
Herbicides							
2,4-D*	X ⁶	X ¹⁰	X ⁷	X ⁸	X ³	X ³	X ¹¹
Benfluralin					X ¹	X ³	
Bensulide				X ²	X ¹	X ²	
Clopyralid			X ⁷			X ²	X ⁷
Dicamba*			X ¹	X ²	X ²	X ³	X ³
Diquat Dibromide			X ¹²		X ¹¹	X ³	
Dithiopyr					X ¹	X ¹	
Fluazipop-p-butyl			X ¹		X ¹		X ¹
Glyphosate*	X ¹²	X ⁶	X ⁴		X ⁶	X ²	
Imazapyr					X ⁷	X ²	
Isoxaben	X ⁴				X ⁷		
MCPA		X ⁶	X ²	X ²	X ¹¹	X ¹	
Mecroprop (MCPP)*	Possible ³	X ¹	X ²	X ¹	X ⁷	X ¹	X ¹
Pelargonic Acid*						X ³	
Pendimethalin*	Possible ³	X ⁶	X ¹			X ²	
Triclopyr			X ⁷		X ⁹	X ¹	X ⁷
Trifluralin*	Possible ³	X ⁶	X ¹		X ⁴	X ¹	
Insecticides							
Acephate	Possible ³	X ⁶	X ¹¹	X ⁸		X ²	
Bifenthrin**	Possible ³	Suspected ^{6,10}		X ⁸		X ¹	X ⁹
Carbaryl	X ³	X ¹⁰	X ⁸	X ¹	X ¹¹	X ¹¹	X ⁷
Fipronil	Possible ³	X ⁶	X ⁸	X ⁸	X ³	X ⁹	
Imidacloprid †			X ⁷		X ²		X ⁷
Malathion*	Possible ³	X ¹⁰	X ¹¹	X ³	X ²	X ²	X ²
Permethrin**	X ³	Suspected ^{6,10}	X ^{1,7}	X ^{8,7}	X ⁹	X ¹	
Trichlorfon	X ¹	X ⁶	X ¹¹	X ¹	X ³		X ²
Fungicides							
Azoxystrobin					X ²	X ²	
Myclobutanil		Probable ⁶	X ²		X ¹		
Propiconazole	Possible ³	X ⁶	X ²		X ¹	X ¹	
Sulfur						X ¹	
Thiophanate methyl	X ¹	X ¹	X ¹	Suspected ¹	X ¹	X ²	X ¹
Ziram	Suggestive ⁴	Suspected ⁴		X ²	X ²	X ¹	
Totals:	16	17	21	14	25	26	12

*These pesticides are among the top 10 most heavily used pesticides in the home and garden sector from 2006-2007, according to the latest sales and usage data available from EPA (2011), available at http://www.epa.gov/opp00001/pestsales/07pestsales/market_estimates2007.pdf.

† EPA lists all synthetic pyrethroids under the same category. While all synthetic pyrethroids have similar toxicological profiles, some may be more or less toxic in certain categories than others. See Beyond Pesticides' synthetic pyrethroid fact sheet at bit.ly/TLBuPB for additional information.

‡ Imidacloprid is a systemic insecticide in the neonicotinoid chemical class, which is linked to bee decline.