

Cannabis Cultivation Project (19955 Grange Road)

PEST MANAGEMENT PLAN

Cultural Control Methods:

Sanitation

Effective pest and disease control methods begin with avoidance, the backbone of which is rigorous sanitation. The facility is routinely cleaned to prevent the build up of excess dirt, dust, and debris via sweeping, mopping, and/or vacuuming. Growing surfaces, such as rolltop benches, are cleaned and sanitized after removal of older plants and prior to placement of new plants on the benches. Weeds in and around the greenhouse and outdoor cultivation are destroyed via hoeing or spraying with organic herbicide. Ant traps are regularly placed around premises to kill ants, which have a symbiotic relationship with aphids and increase aphid pressure significantly. Dead and unhealthy leaves are removed from cannabis plants and container media are kept free of dead leaves and weeds. Tools, such as pruning shears, are routinely sanitized with rubbing alcohol during use as well as before and after use.

Scouting

Trained horticultural technicians routinely monitor plants and indicator cards (e.g., sticky yellow and blue cards) for the presence of pests and disease and/or symptoms of their damage. Additionally, plants are routinely removed from containers and the roots and soil is inspected for the presence of pest and disease.

Irrigation & Fertilization

In order to avoid environmental conditions and depleted plant health conducive to pest and/or pathogen infestation plants are properly irrigated and fertilized.

Environmental Monitoring

Anticipating pest and pathogen pressure via monitoring weather forecast allows cultivators to take prophylactic measures (changes in environmental control parameters, changes in irrigation/fertilization, application of preventative chemical control products, preventative release of biological control agents) prior to outbreaks of pests or disease.

Biological Control Methods:

Biological Control Agents

Release of insect, arachnid, and nematode natural enemies of pests is performed on both preventative and reactive/curative bases. Natural enemies, also known as biological control agents, are typically either predators (directly consume pest) or parasitoids (lay eggs in pests) or pests. Biological control agents are released on scheduled basis; their releases are increased in quantity and frequency when necessary based on weather forecasts indicating increased pest pressure and/or identification of pests or symptoms of their presence. Chemical control methods are typically ceased for approximately one week following biological control agent releases.

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Microbial Pesticides

Microbial pesticides are used prophylactically when pest and disease pressure is high and reactively under pre-infestation level pest and pathogen levels. Microbial pesticides contain live or dormant inoculum of bacteria or fungi and/or metabolites derived from their fermentation. Acceptable microbial insecticides active ingredients include *Bacillus thuringiensis* subsp. *Kurkstaki*, *B. thuringiensis* subsp. *Israelensis*, *Beauveria bassiana*, *Burkholderia* spp., *Chromobacterium subtsugae*, and *Isaria fumosorosea*; the modes of action of most microbial insecticides are enzymatic degradation of pest exoskeletons, stomach poisons that necessitate ingestion by pest, and reduced pest reproductive capabilities following exposure. Acceptable microbial fungicides and bactericides active ingredients include *Bacillus amyloliquefaciens*, *B. subtilis*, *Streptomyces lydicus*, and *Trichoderma harzianum*; the most common mode of action of microbial fungicides and bactericides is suppression via competitive exclusion, meaning that preventative applications are the most effective way to apply these materials.

Chemical Control Methods:

Prophylactic

Similar to microbial pesticides, many of the pesticides acceptable for use of cannabis in California are most effective when applied preventatively and/or when pest populations and disease levels are low. Examples of acceptable chemical pesticides that can or must be used prophylactically are azadirachtin, neem oil, phosphorous acid, potassium silicate, *Reynoutria sachalinensis* extract, and sulfur. Preventative chemical control method modes of action generally activate plant immune responses to improve resistance to pests and pathogens and/or leave a residue on plants to create conditions undesirable for pests and pathogens.

Curative

The limited number of acceptable curative chemical control insecticides/acaricides generally have two modes of action: smothering/suffocation and desiccation; such active ingredients include horticultural oil, potassium salts of fatty acid, and sulfur. Curative chemical control fungicides/bactericides generally have three modes of action: leaving residue on leaf surface that changes leaf chemistry in fashion unsuitable for pathogens, oxidation, and desiccation; examples of these active ingredients include potassium bicarbonate, hydrogen dioxide and peroxyacetic acid, potassium salts of fatty acid, horticultural oil, and sulfur. While curative control methods are effective at eradicating pests and pathogens, they are most effective when applied prior to infestation levels and make curative applications prior to severe outbreaks occurring.

Products that may be applied at any Stage of Plant Growth

Product Name	Ingredient(s)
Azaguard	Azadirachtin
Azamax	Azadirachtin
Pyganic Gardening	Pyrethrins
Pyganic 5.0	Pyrethrins
Green Cleaner	Soybean oil, Sodium lauryl sulfate, Isopropyl alcohol, Water, Sodium citrate, Citric acid
Circadian Sunrise	Water, Corn oil, Sodium lauryl sulfate, Kaolin clay, Gum Arabic, Potassium bicarbonate