

Abstract

Introduction

Nature is equipped with all the right systems and services in order to be self sustaining. But in the global flower industry, growers are battling insect infestations like never before because of stricter import laws by the United States Department of Agriculture. In order to ensure the processing of their flowers, growers douse them in pesticides making them inedible and harmful to those who work with them. As edible flowers are making their way into the market on cakes and desserts, fresh salads, specialty spreads and much more it's imperative that they are grown in a sustainable and safe manner. This research looked at the common pests and predators of edible flowers in an effort to use plants natural pest services to eliminate the need for pesticides in the production of edible flowers.

Conceptual/ Theoretical Framework

Mabel's Garden plots are focused on using a technique called lasagna gardening which was developed by observing natural earth systems and implementing them into the garden to make it low maintenance. Based off of the same principles, my research examined the natural pest control systems commonly found in edible flowers to grow a pesticide free crop.

Methodology

For my research, I gathered information from The Old Farmer's Almanac on different aspects of several edible flowers including common pests and common predators (see table in RESULTS). In a 4x8 plot, I will test out results from initial research by intercropping Calendula, Pansies, Chive, and Nasturtium. Chives, for example, attract many beneficial insects such as, ladybugs and parasitic wasps, and have the ability to deter pests such as, slugs which are common in pansies. The plot should be low maintenance and pest free.

Results/Findings

The first table is an overview of each edible flower studied and their common pests and predators they attract. Also, an additional column has been added for pests that the flower/plant deters because many give off specific scent and or oils that deter common pests.

Edible Flower	Pests	Predators	Deter
Bachelor Buttons	aphids, japanese beetles, flea beetles, weevils, grasshoppers	hoverflies, ladybugs, lacewings, parasitic wasps, birds	-
Begonias	slugs, snails, aphids, caterpillars, earwigs	-	-
Calendulas	aphids, whiteflies, thrips	ladybugs, lacewings, hoverflies	nematodes
Carnations	aphids, thrips	-	-
Chrysanthemums	aphids, spider mites, leaf miners	parasitic wasps	japanese beetle
Clover	alfalfa weevil	-	-
Dandelions	-	lacewings, ladybugs, birds	-
Daylilies	-	Hummingbirds	-
Gladiolus	spider mites, thrips, aphids	-	-
Holly Hock	slugs, snails, spider mites, japanese beetles	-	-
Honeysuckle	caterpillars, scale insects, aphids	-	-
Impatiens	caterpillars, aphids, whiteflies, thrips, spider mites	hummingbirds	-
Lilac	slugs, snails	hoverflies, birds	-
Marigold	spider mites, slugs	ladybugs, hoverflies, birds	nematodes
Nasturtiums	flea beetle, caterpillars, aphids, slugs, whiteflies	-	-
Pansies	slugs, snails, aphids	-	-
Peonies	nematodes, japanese beetles	-	-
Phlox	stem nematodes, leaf miners, caterpillars	hummingbirds	-
Primrose	slugs, snails, spider mites, aphids	-	-
Queen Anne's Lace	-	lacewings, lacewings, ladybugs, hoverflies, parasitic wasp, tachinid fly	-
Roses	japanese beetles, aphids, spider mites, thrips	-	mice, voles, deer
Sunflower	aphids	ladybugs, birds	-
Tulips	nematodes, aphids, snails, slugs, mice	-	-
Violets	mealybugs, thrips, cockroaches, aphids, whiteflies	-	-

Zinnias	aphids, thrips, whiteflies, broad mites, leaf miners	parasitic wasps, hoverflies, hummingbirds, birds	-
Zucchini	aphids, stink bugs, cucumber beetle, squash beetle	-	-
Anise Hyssop	-	birds	-
Basil	-	-	nematodes, aphids, whiteflies, spider mites, thrips
Borage	-	parasitic wasps	squash beetles
Chervil	aphids, slugs, small animals	parasitic wasps	-
Chive	-	ladybugs, parasitic wasps, hoverflies	whitefly, aphids, snails, japanese beetles
Cilantro	leafhoppers, aphids	parasitic wasps, hoverflies	-
Fennel	caterpillars	lacewings, ladybugs, hoverflies, parasitic wasps, tachinid flies	-
Lavender	white flies, spittlebugs	-	moths

The second table explores the most common beneficial insects and what plants will bring them to the farm.

Also, the third column contains the common edible flower pest that is affected by the beneficial insect.

Beneficial Insect	Edible Flower	Pest Affected by Beneficial Insects
Ladybug	Bachelor Buttons, Mint, Fennel, Chive, Queen Anne's Lace, Sunflower, Marigolds, Dandelions, Calendula	aphids, mites, whiteflies, scale insects
Parasitic Wasps	Bachelor Buttons, Zinnias, Thyme, Fennel, Cilantro, Chervil, Chive, Borage, Queen Anne's Lace, Chrysanthemums	aphids, beetle larvae, cucumber beetle, japanese beetle, leaf miners, mealybugs, scale insects, whiteflies
Lacewings	Bachelor Buttons, Oregano, Fennel, Queen Anne's Lace, Dandelions, Calendula	aphids, mites, caterpillars, leafhoppers, mealybugs, whiteflies
Hover Flies	Bachelor Buttons, Zinnias, Fennel, Cilantro, Chives, Queen Anne's Lace, Marigolds, Lilac, Calendula	aphids, thrips, scale insects, caterpillars
Tachinid Flies	Thyme, Fennel, Queen Anne's Lace	caterpillars, larval beetles, earwigs, grasshoppers
Hummingbirds	Zinnias, Sage, Phlox, Impatiens, Daylilies	aphids, beetles, mites, weevils
Birds	Sunflowers, Cornflowers, Dandelions, Marigolds, Zinnias, Anise Hyssop	grasshoppers, beetles, moths, stickbugs, leafhoppers, aphids, whiteflies, scale insects, caterpillars, earwigs, weevils

Conclusions

- For the most productive pest suppression, herbs are a great choice. They deter pests by strong aromas often confusing the pest. Intercropping several herbs throughout edible flowers will overwhelm the pests and attract beneficial predators.

- The addition of tall sturdy plants such as sunflowers, attract birds by providing perching areas and big seeds for food. The birds eat the bigger pests such as grasshoppers and moths.
- Biodiversity is vital to creating a self sufficient farm as evidenced by the wide variety of pests and predators and their vast needs.
- More research needs to be done to find sustainable solutions to slugs and snails. Few plants deter them and none of the common predators prey on snails or slugs.

Recommendations

To produce chemical free edible flowers, I recommend that intercropping is used to increase biodiversity, increasing the amount of beneficial insects on the farm and allowing the plants to work together to ensure a healthy yield. Plant a wide variety of strong smelling herbs to deter many pests and attract beneficial insects. If significant pest populations appear, blast the crop with water knocking them off, prohibiting them from returning. If the problem persists it is best to remove the devastated parts and place in a bucket of water.

Further research is needed on the implementation of these practices in Western Kentucky. This work is planned for spring and summer 2019.

References

Gardening. (n.d.). In *The Old Farmer's Almanac*. Retrieved from <https://www.almanac.com>

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