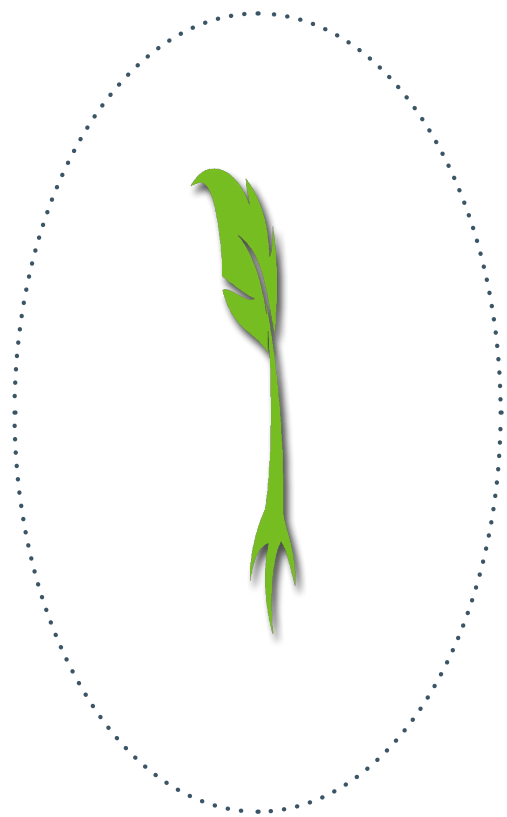
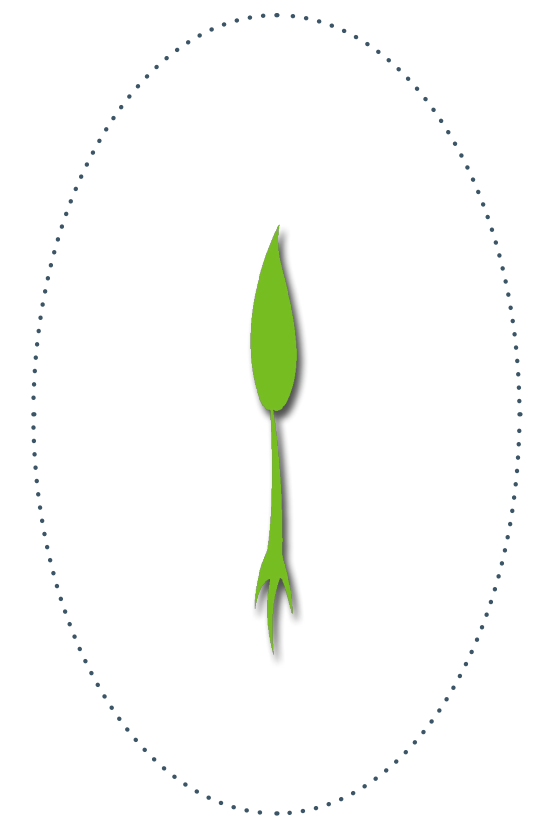


Pesticides The Evolution



prehistory prior to 10,000 BC

- The earliest forms of pest control were physical barriers used to discourage pests such as mud, dung and animal fat
- Smoke from the burning of straw, dung and other organic matter was used to clear areas of pests
- Animals and early humanoids found that crushing ants released formic acid, which could be used as a pest deterrent
- Early cultures began to realize that certain plants and botanicals, like sticky saps, were useful in warding off unwanted pests



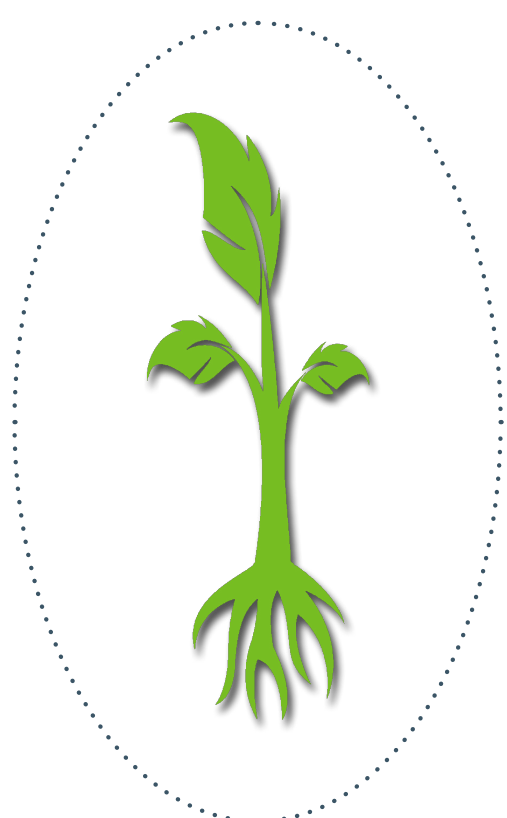
antiquity 10,000 BC to 500 AD

- Easily accessible inorganic compounds such as copper salts and sodium chloride were found to have pesticidal properties at the same time as the Greeks and Romans discovered sulfur as the earliest method of home fumigation
- Heavy metals like arsenic and mercury were used by early Chinese cultures to kill body lice
- Liquid from crushed olive pits, called Amurea, was used in agriculture to protect crops against weevils and aid in the growth of seeds
- Greek and Roman farmers often believed in using prayer, ritual and mystical means for protecting their crops from disasters and plagues



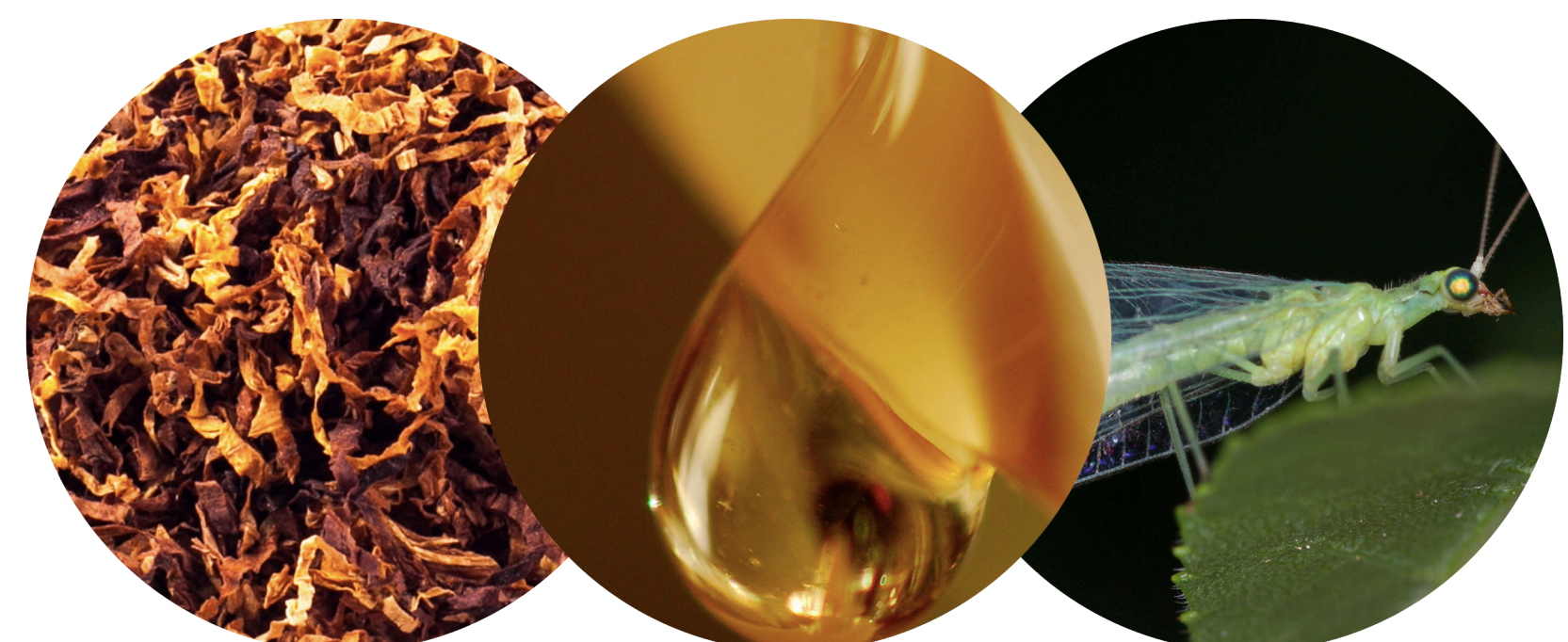
post classical era to renaissance 500 AD to 1600 AD

- Aside from the hand removal of pests, the Middle Ages saw few new pest control developments: in 1320, the cockchafer beetles were ordered by a French court to depart the area - failing to do so, they were collected and killed
- Tobacco extracts, which emerged with the discovery of the new world, were found to protect other crops
- Common poisons of antiquity, such as cyanide and strychnine, morphed into common pesticides in the Middle Ages
- Historical pest controls (prayer, botanicals, elemental compounds and soaps) continued to be in use throughout the Middle Ages



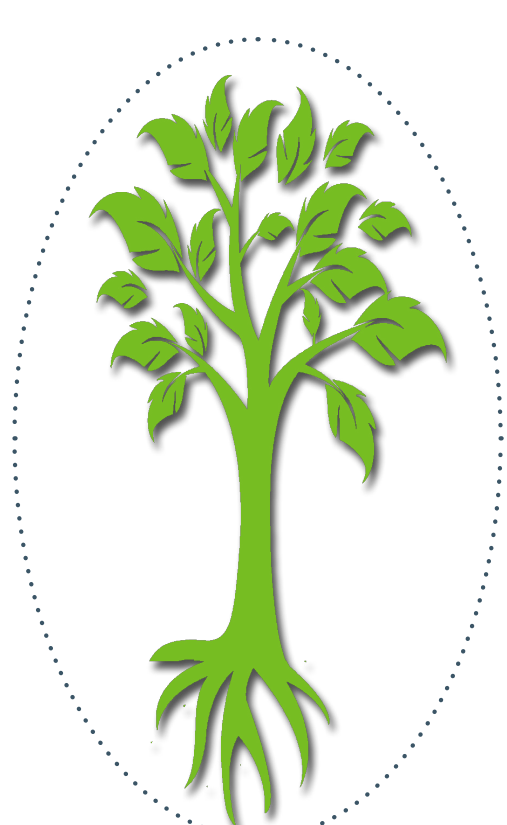
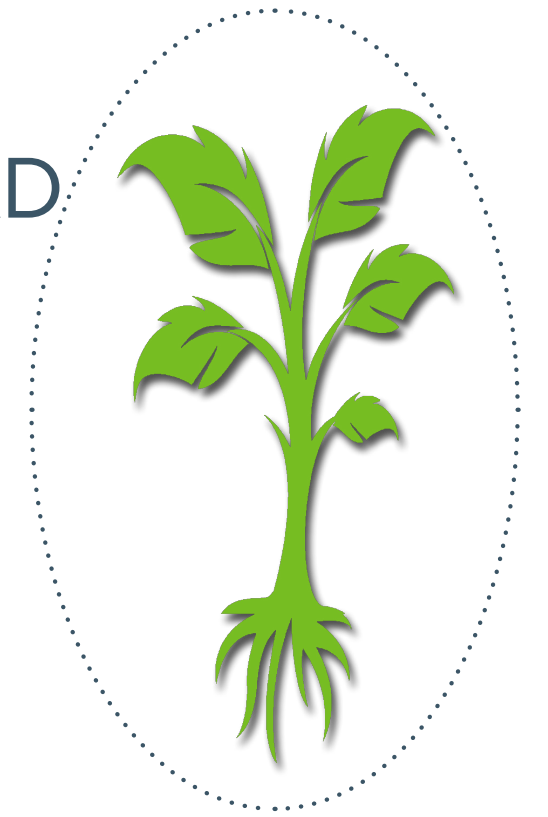
colonial era 1600 AD to 1800 AD

- Nicotine was first extracted from tobacco in 1690
- Baits made of honey and arsenic were widely used to control crawling pests such as ants
- Creosote, soap and oils started being utilized as pesticides; seagoing ships were coated with creosote to discourage rot and pests
- In 1742, Réaumur suggested releasing lacewings in greenhouses to kill aphids
- Extracts of common plants, such as Rue, were discovered as having pesticidal properties



victorian era 1800 AD to 1900 AD

- Faraday, in 1825, created the first synthetic pesticide, BHC
- One of the most widely used synthetic pesticides in history, DDT, was synthesized by Zeidler in 1873
- The mechanism for the pesticide properties of common plants, such as daisies and mums, was discovered, which led to the development of pyrethrin and rotenone extracts
- The first commercial mixes of pesticides, Paris Green and lead arsenate, were produced
- A pesticide called Bordeaux Mixture was created to combat the pests responsible for the Great French Wine Blight



20th & 21st centuries 1900 AD to the present

- BHC & DDT were rediscovered as pesticides and became a wartime tool
- Post-WWII agriculture and chemical discoveries fed a pesticide boom: organophosphates, organochlorides, phenoxyacetic acids, and carbamates
- 1950's and 60's saw insect resistance and Carson's *Silent Spring* (1962) which referenced the loss of songbirds as a sign of the environmental impact of pesticides
- Pesticide development and use escalated creating some of the most widely used pesticides in history: glyphosate (1971) & imidacloprid (1988)
- Imidacloprid's success was tainted by being linked to bee hive collapse (2000's)
- Glyphosate's popularity led to the Roundup® Ready soybean which launched the GMO revolution (1990's to present day)



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