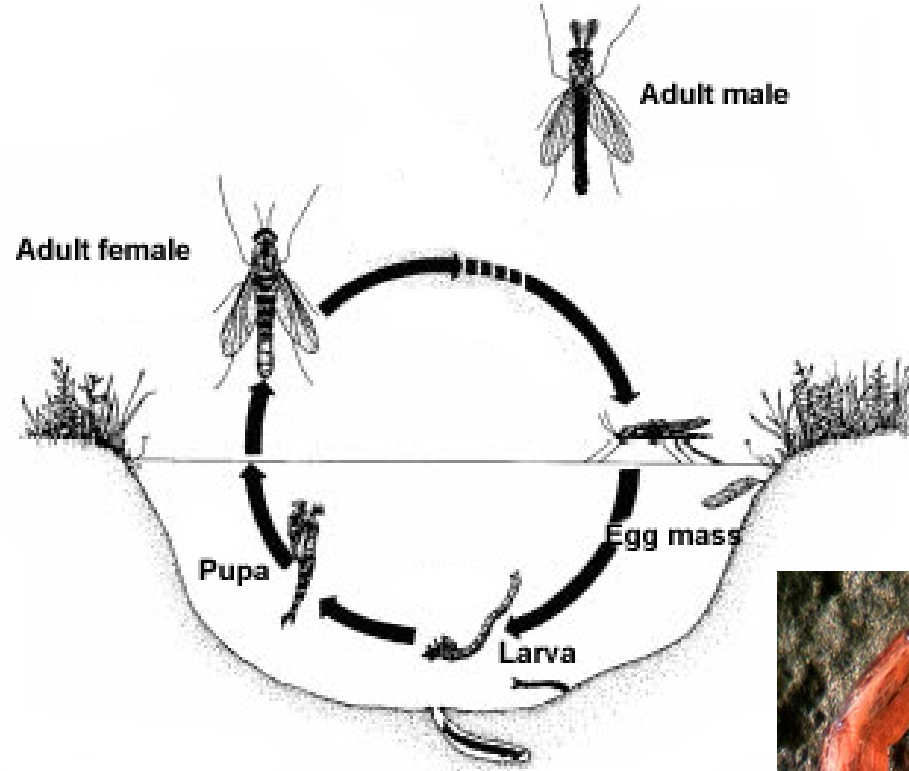




MIDGE NUISANCE – A SWARM IN A ~~TEACUP~~ POND

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Chironomus Zealandicus – NZ Midge



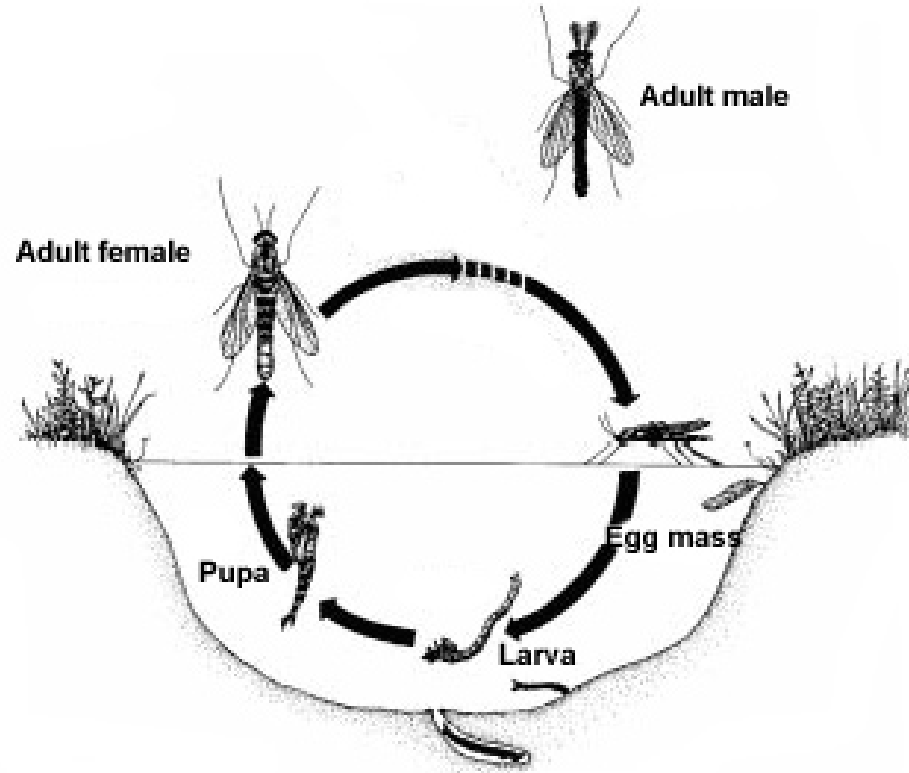
So What ????

SWARM



Chemical Control

- Insecticides
 - Larvicide
 - Adulticide



Chemical Control - Larvicide

Chemical	Mode of Action
Methoprene	Juvenile Hormone Analogues
Pyriproxyfen	Juvenile Hormone Mimic
Diflubenzuron	Inhibitor of chitin biosynthesis
<i>Bacillus thuringiensis israelensis (Bti)</i>	Microbial disruptors of insect midgut membranes
<i>Bacillus sphaericus</i>	Microbial disruptors of insect midgut membranes



Chemical Control - Adulticide

Chemical	Mode of Action
Malathion (Maldison)	Organophosphates
Temephos	Organophosphates
Etofenprox	Sodium channel modulators
Pyrethrin	Sodium channel modulators
Bifenthrin	Sodium channel modulators
Spinosad	Nicotinic acetylcholine receptor (nAChR) allosteric modulators (spinosyns)
Spinetoram	nAChR allosteric modulators (spinosyns)



Chemical Control - Adulticide



Chemical Control - Toxicology

Risk to non-target species ?

- Eels...photo..
- Direct contact
- Secondary contact



Other Control Options

Control	Mode of Action
Invertebrate predators – planarian flatworm	Consumes Larvae
Agnique Monomolecular Film	Reduces water surface tension - prevents adult emergence
Light Boards	Midges attracted to light – Boards sprayed insecticide
LED lighting posts and spray	Midges attracted to light – Insecticide auto-sprayed
Barrier vegetation	Barrier and Surface for insecticide spraying
Saltwater flushes	Midges intolerant to salt water
Sun bakes	Stresses and kills larvae
Mechanical dredging of sediment materials	Physical removal of larvae
Electrocutor traps	Midges attracted to light – Electrocutation



Midge Monitoring

Technique	Effectiveness
Number of public complaints	Widely used
Yellow sticky traps	Convenient
Larval counts	Not strongly correlated with other methods
Egg-mass counts	Inaccurate for larger populations
Adult emergence traps	Not effective for large scale operation



Conclusions

- No easy solution
- **Integrated Management Plan:**
 - Larvicide e.g.methoprene (summer)
 - Adulticide vegetation spray e.g. Etofenprox (summer)
 - Alternating chemicals
 - LED light traps with adulticide sprays
 - Vegetation planting programme
 - Monitoring e.g. yellow sticky traps



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Questions?

