

Tus kab/yoov, Swede Midge, *Contarinia nasturtii*

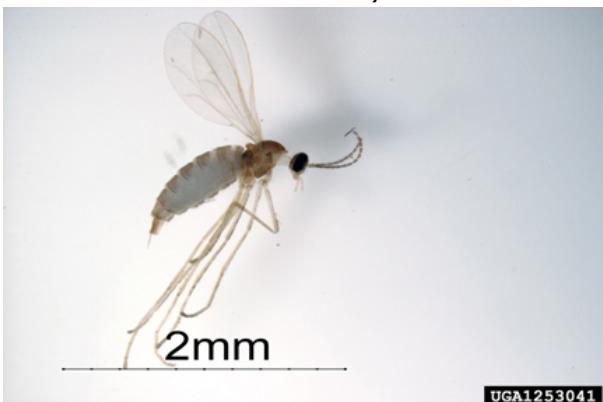
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PIB QHIA

Tus kab/yoov Swede midge (SM), *Contarinia nasturtii*, (Diptera: Cecidomyiidae) yog ib tug kab es noj yuav luag txhua hom zaub es yog hom zaub ntsuab mustard (Brassica's: broccoli, brussels sprouts, zaub qhwv, zaub paj - cauliflower, mustard greens, kale), nrog rau cov noob cog ua roj kib zaub, hu ua canola. Ntxiv mus thiab, ntau tshaj 20 hom nroj tsuag es cov kab no nyiam nyob thiab yug tau lawv, xws li qos liab qus los yog wild radish, shepherd's purse, field pennycress, thiab yellow rocket. Tus kab/yoov Swede midge yog hom kab ib txwm nyob rau daim av loj hu ua Europe, thiab thawj thawj zaug pom lawv nyob rau pem qaum teb North America hauv lub nroog Toronto, Canada, thaum xyoo 2000. Ces nws kis mus rau lub lav New York thaum xyoo 2004, thiab tsis ntev no ces pom cov kab/yoov no nyob hauv lub lav Minnesota thaum xyoo 2016.



Daim duab 1. Tus kab Swede midge thaum loj txaus (Susan Ellis, USDA APHIS PPQ, <https://bugwood.org/>)

LEB CEV ZOO LI CAS

Tus kab/yoov Swede midge thaum loj txaus lawm ces yog xim suab thaj dawb zem zuag, ntev li ntawm 2 mm, thiab twb yuav luag ntsia tsis pom qhov txawv ntawm lwm cov kab midge tshwj tsis yog tias muab los tsom ntawm lub iav saib tej yam khoom me me.



Daim duab 2. Tus kab Swede midge larvae nyob ntawm tus kav zaub cauliflower (Mao Chen, Cornell University, <https://bugwood.org/>).

Hauv lub lav Michigan thiab New York cov kab no loj txaus ya tawm thaum lub caij nplooj ntoos hlaw pib thiab thaum nruab nrab. Cov qe mas me aiv heev li (me tshaj 0.5 mm), xim dawb tsem tseb, thiab lawv nteg ua ib pawg rau cov nroj tsuag es tseem tsis tau loj, thiab cov ntoo es tseem yuav loj hlob tas mus li.

Cov kas mas kheej li lub raj xyooob thiab pom tshab plaws thaum tseem yau, ces nws hloov mus rau xim daj plhes thaum loj txog ntu kawg, thiab lawv ntev li ntawm 3-4 mm. Thaum lawv tseem yog tus kas mam lawv noj ua ib ke ib pawg txog ntua thaum lawv loj txog ntua qib kawg, qib es lawm poob ntawm tsoob ntoo los mus hauv av es mus nkaum hauv ib lub plhaub. Nyob hauv lub lav Michigan, muaj ntau npaum li peb-tsib phaum kab thaum lub Tsib hlis ntuj mus txog lub Kaum hli ntuj.



Closeup of larvae feeding in clusters.

Daim duab 3. Tus kab Swede midge larvae nyob ntawm tus kav zaub cauliflower (Mao Chen, Cornell University, <https://bugwood.org/>)

PUAS TSUAJ

Tus kab/yoov Swede midge yog tsev kab ntawm gall-making family Cecidomyiidae, es thaum lawv noj cov qoob loo ces ua rau cov qoob loo caws thiab tsis zoo nkauj lawm. Qhov kev puas tsuaj tsim ntawm cov kab no ua rau cov nplooj ntoo caws thiab to, ua rau tsoob zaub loj tsis taus. Tej zaum kuj muaj kev puas tsuaj xws li ua rau cov zaub tsis muaj tej yam zoo rau tib neeg lub cev xws li nutrient thiab siv tshuaj tua ntau ces yuav ua rau cov zaub loj tsis tau zoo; yog li no, thaum muaj cov kab no yuav tsum nrhiav kom tau es thiaj li paub tseeb tias yog hom kab no tiag.



Daim duab 4. Tus kav zaub ntawm hom zaub Brussel sprout caws (MN Dept. of Ag.)



Daim duab 5. Cov nplooj zaub caws thiab loj dhau ntawm hom zaub qhvw liab (Julie Kikkert, Cornell Cooperative Extension, Bugwood.org)

TSWJ KOM TAU

Tej zaum qhov es tseem ceeb tshaj plaws es koj yuav tsum tau ua ces yog tiv thav kom tsis txhob muaj cov kab no thaum pib xwb. Nrog cov neeg es muag cov yub zaub rau koj cog kom koj thiaj li paub tseeb tias cov yub zaub ntawd yeej tsis muaj cov kab no, es koj thiaj li tsis muaj cov kab no hauv koj daim teb. Yog tias thaum cog es twb yeej muaj cov kab no lawm, ua ntej yuav cog mas yuav

tsum tau siv tshuaj tua cov yub thiab txuag rau cov av ua ntej yuav cog cov yub zaub no.



Daim duab 6. Lub paj zaub qhvv dawb Cauliflower “tsis loj hlob” vim cov kas muab noj. Lub taub hau zaub qhvv yeej yuav tsis loj tuaj li. (MN Dept. of Ag.)

Hom Zaub Twg Yog Hom Cov Kab No Nyiam

Cov neeg tshawb fawb nyob hauv lub tsev kawm ntawv qib siab University of Guelph (Ontario, Canada), tau muab ntsuam xyuas thaum xyoo 2001-2003 qhia tau tias cov kab Swede midge nyiam noj zaub broccoli, zaub cabbage, zaub paj thiab zaub qhvv Brussels sprouts. Lawv nrhiav tau tias cov zaub broccoli yog cov es lawv nyiam tshaj plaws. Ntawm hom zaub broccoli es tau muab ntsuam xyuas, ‘Paragon’, ‘Eureka’ thiab ‘Packman’ yog cov es puas tsuaj ntau tshaj ntawm peb lub xyoos es tau los muab soj ntsuam xyuas, tab sis cov zaub broccoli Triathlon’, ‘Regal’ thiab ‘Everest’ pom tau tias lawv tsis puas tsuaj ntau thiab kev loj hlob ntawm cov kab no loj qeeb dua. Ntawm 3 lub xyoos es los kawm soj ntsuam xyuas, cov zaub cabbage ntsuab thiab zaub cabbage liab yeej tsis muaj qhov puas tsuaj sib txawv li, cov zaub paj xim dawb, xim liab, xim liab tsem tseb los kev puas tsuaj yeej tsis sib txawv li; cov zaub qhvv ‘Jade Cross’ Brussels sprouts pom tau tias cov kab no tsis tshua noj ua rau lawv puas tsuaj ntau.

SOJ NTSUAM XYUAS

Txawm tias yeej muaj cov khoom es cuab thiab tswj kom tau cov kab midge es loj txaus (cov txiv), cov kab no kuj yog ib hom kab es nrhiav pom nyuaj heev, thiab cov kab/yoov es laus lawm kuj nteg qe, daug ua kas es twb ua rau qoob loo puas tsuaj ua ntej yuav ntes tau lawv. Cov neeg tshawb fawb hauv Cornell qhia kom siv daim cuab es yog xim dawb hu ua white Jackson trap (Scentry Biological Inc., Billings, MT), es nws yog daim ntawv nplaum xim dawb es muaj ib co kua tsw hu ua pheromone kom cov kab no nyiam es thiaj ya los tsaws rau. Tej daim ntawv nplaum no yuav tsum tau muab cuab kom qis ze rau hauv av thiab mus saib txhua txhua lub asthiv. Cov kev tshawb fawb yav tag los hauv NY thiab Canada tshawb pom tias yog ntes tau 5 tug yoov ces qhov no qhia tau tias twb yeej nteg qe thiab daug ua kas ua rau qoob loo puas tsuaj lawm. Yog hais tias cuab tau yoov ntawm daim ntawv nplaum no ces kav tsij nrhiav txoj hauv kev tiv thaiv kom tsis txhob muaj cov kab no coob coob. Ntxiv mus thiab hais txog tswj cov kab no thaum ua yoov lawm, yuav tsum tau soj ntsuam xyuas cov qoob loo kom pom cov qoob loo es puas tsuaj. Mus ncig saib ntawm tej ntug teb thiab saib seb cov nplooj zaub puas caws, to qhov, los yog loj tsis taus (Daim duab 3-5).



Daim duab 6. Jackson trap tswj cov kab swede midge es ya tau (Cornell Extension)

Tswj Yam Tsis Siv Tshuaj Tua

Hloov Chaw Cog Qoob Loo: Cov kab Swede midge pom tau tias lawv muaj ntau zus nyob rau hauv cov av, yog li ntawd nws yog ib qho tseem ceeb heev es yuav tsum tau hloov chaw cog qoob loo. Cov neeg tshawb fawb ntawm Cornell qhia tias yuav tsum hloov chaw es tsis txhob cog cov zaub Brassica li ntawm peb lub xyoos rau qhov chaw qub. Ntxiv mus thiab, yuav tsum tau nthua cov nroj es nyob ib puag ncig ze ntawm daim teb. Cov nroj es ntxim li cov kab no yuav nyob thiab yug tau lawv ces yuav tsum muab luaj kom tuag kom tag.

Tu kom tsis txhob muaj yam tsis huv tsuas & Rhuav tshem cov qoob: Txawm tias peb tsis tau muaj cov ntaub ntawv data qhia kom paub tseeb txog cov kab swede midge, los qhov kev kawm txog lwm cov kab es zoo sib xws (piv txwv, cov yoov nyiam noj txiv hmab txiv ntoo, cov kab spotted wing drosophila), yeej qhia tau pom tias yog muab tsob zaub los yog cov nroj es muaj cov kab no tso rau hauv ib lub hnab yas (xim dawb), thiab muab lub hnab no ziab tshav li ntawm 4-5 hnuv, li no xwb yeej kub siab npaum li (e.g., >120 to 140°F) sab hauv lub hnab es tua kom tau cov kab swede midge. Ua li no yeej siv tau rau cov teb es me me los yog tej vaj es hauv zej zog, thiab qhov chaw es twb yeej pom tau tias nyuam qhuav muaj cov kab SW no tshwm sim tshiab tshiab. Tom qab 5-7 hnuv lawm, cov nroj tsuag nyob hauv lub hnab muab faus av tau lawm los yog muab ua kom puas tsuaj tau lawm.

Muab cov zaub zom xyaw av ua chiv: Hais ib zaug dua thiab, yeej tsis tau muaj kev tshawb fawb kom paub tseeb kiag txog cov kab swede midge no, tabsis cov tswv teb kuj yuav tsum tau sim qhov kev muab cov nroj tsuag no zom xyaw av ua chiv kom tswj tau cov kab swede midge no. Txawm tias lub tswv yim no yuav tswj tsis tau zoo npaum li

muab ntim rau hauv hnab yas los, nws kuj zoo siv dua rau cov teb es loj thiab dav. Qhov xav kom zoo ces, cov zaub thiab nroj tsuag es muaj cov kab no lawm ces yuav tsum tau muab lawv tso ua ib pawg siab siab kom muaj tshav ziab kom kub txog li 120-140°F. Nyob rau hauv lub lav Minnesota, yog muaj ib lub county twg (xws li Ramsey Co) es yog qhov chaw zom chiv, thiab cov teb no ho nyob rau hauv lub county no, ces cov zaub thiab cov nroj no kuj muab thauj mus tau rau qhov chaw no muab zov ua chiv. Txawm li ntawd los, nyob rau hauv Hennepin County, es yeej ib txwm muab cov nroj tsuag es muaj kab no thauj mus rau lwm lub county zom ua chiv, kuj tsis tau pom tias yuav kis tau rau lawv, tabsis qhov chaw zom chiv hauv lub county no yuav tsis kam zom. Qhov es yuav kom zoo tshaj plaws, es yog rau cov khoom es muaj cov kab noj qoob loo no, yuav tsum tau muab cov nroj tsuag thiab zaub no zom ua chiv kiag ntawm thaj chaw, kom thiaj li tsis muab lawv thauj mus los ntau zaus.

Siv Tshuaj Tua

Cov kab Swede midge no yeej tswj tau lawv yog siv cov tshuaj txuag tiv thaiv. Cuab thiab ntes kom tau lawm yog thawj kauj ruam es pom tau tias lawv tawm hauv av los lawm. Thaum pom tau tias cov zaub xws li yog cov cole crops no caws lawm, txuag tshuaj sib hloov ntso ib zaug twg kem ntev li xya-cuaj hnuv mas yeej tswj tau cov kab no zoo nyob rau lwm lub lav.

Cov kev es tswj cov kab no thaum ntxov kuj yuav ua kom tsis txhob tau txuag tshuaj ntau ntau rau cov nplooj zaub, tabsis ib qho kev kawm paub txog los ntawm University of Guelph thiab Cornell University qhia tau tias yog txuag ntxiv rau cov nplooj zaub no yeej yog ib qho tseem ceeb thaum lub caij nruab nrab ntawm cov qoob loo thiab tom qab phaum qoo loo no thiaj li tswj kom tsis txhob muaj cov kab swede midge no hauv daim teb.

Feem ntau mas cov tshuaj pyrethroid, carbamate thiab organophosphate yog tua tau cov kab swede midge no tuag tag. Cov tshuaj ntixv thiab kuj yog lambda-cyhalothrin, permethrin, acetamiprid, chlorpyrifos thiab dimethoate. Cov tshuaj Bt (*Bacillus thuringiensis* subsp. *israeliensis*) tua tau ntau li ntawm 50% cov kas es sim hauv chav kawm, tab sis mas tsis muaj cov tshuaj organic certified (OMRI-approved) es siv tau kom tua tau cov kas no hauv daim teb. Siv cov tshuaj no nkaus xwb yeej pab tswj tsis tau kom tsis txhob muaj cov kab no coob coob. Yuav kom tswj tau zoo tshaj plaws, yuav tsum tau ntsuas sij hawm koj thwj thaum txuag cov tshuaj no thiab sib hloov tshuaj txuag, thiab rhuav tshem cov nroj tsuag es yug cov kab no, mas thiaj li yog qhov es yuav tswj kom tau zoo kom tsis txhob muaj coob coob.

(li cov chaw nram qab teb southern MN), tabsis cov kab no kuj nkag tau los hauv lub lav MN los ntawm cov zaub es xa tuaj ntawm lwm lub lav tuaj. Cuab kom tau yuav yog ib qho kev ntsuam xyuas kom paub txog cov chaw es muaj cov kab SW no hauv lub lav Minnesota. Tshawb fawb kom paub txog qhov es lawv thev no yuav tsum tau tshawb nrhiav kom paub es thiaj li nkag siab tias cov kab no muaj peev xwm tsis tuag taus hauv lub lav no no nov, thiab kom paub txog lawv qhov kev xeeb ua kab los yog qhov life cycle ntawm lub lav no no hauv MN.

Cov tswv teb es muaj kev xoom xaim tias tsam lawm daim teb muaj cov kab swede midge no yuav tsum tau nrhiav kom tau pov thawj, thiab hu rau MN lub tsev tswj cov kab noj qoob loo hu ua MN Pest Alert Program, ntawm: email: arrest.the.pest@state.mn.us

Table 1. Cov tshuaj qhia txog siv rau cov zaub cole crops hauv lub lav Minnesota .

LUB NPE TSHUAJ	SIV TOV NROG	PHI (HNUB)	REI (XUAJ MOO)	FAIM TSHUAJ TWG
ASSAIL	ACETAMIPRI	7	12	NEONICOTINOIDE
CORAGEN ^{1,2}	CHLORANTR ANILIPROLE	3	4	DIAMIDA ANTRANILICA
EXIREL ¹	CYANTRANILI	1	12	DIAMIDA
MOVENTO	ESPIROTETRA	1	24	ÁCIDO TETRAMICO
WARRIOR II ^{1,2}	LAMBDA-CYHALOTHRIN	1	24	PIRETROIDE

¹NOT LABELED FOR SWEDE MIDGE CONTROL

²RESTRICTED USE PESTICIDE (RUP)

TEJ KEV ES YUAV TSUM TAU LOS SOJ NTSUAM NTXIV TXOG KEV TSWJ THIAB KEV TSHAWB FAWB

Cov ntaub ntawv es tau sau tseg txog muaj cov kab no thaum xyoo 2016 thiab 2017 ib puag ncig hauv lub nroog ntxaib, tej zaum yeej muaj tseeb tias cov kab Swede midge no kuj tsis tuag thaum lub caij ntuj no hauv MN

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