Decomposers and Root Feeders Impact Plant Protection in Sinapis Alba

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e in ica e ela ion hi be een decom o e , oo feede , and lan o ec ion in eco em , a ic la in he con e of Sina i Alba (hi e m a d), a e of a amo n im o ance fo nde anding ecological d namic and ag ic l al ainabili [1,2]. Decom o e , com i ing a di e e a a of mic oo gani m ch a bac e ia, f ngi, and oil in e eb a e , la i o al ole in n ien c cling and oil heal h main enance. Conc en l, oo feede , incl ding nema ode and oil-d elling in ec , can e e igni can e e on lan b feeding on oo i e , he eb im ac ing lan g o h and od c i i [3,4]. In hi in od c ion, e del e in o he ecological igni cance of decom o e and oo feede in ha ing lan o ec ion mechani m in Sina i Alba. While decom o e con ib e o oil o ganic ma e decom o i ion and n ien mine ali a ion, oo feede can com omi e lan heal h and e ilience h o gh di ec feeding damage [5,6]. Ho e e , he in e ac ion be een he e oil o gani m and Sina i Alba a e com le and m l iface ed, i h bo h o i i e and nega i e im lica ion fo lan o ec ion. Unde anding he d namic be een decom o e , oo feede , and Sina i Alba i e en ial fo el cida ing eco em f nc ioning and de elo ing ainable ag ic l al ac ice [7,8]. B com ehen i el e lo ing he e ela ion hi , e can iden if o o ni ie o enhance lan e ilience o e and di ea e hile omo ing oil heal h and biodi e i con e a ion. i in od c ion e he age fo f he e lo a ion of he in ica e in e la be een decom o e , oo feede , and lan o ec ion mechani m in Sina i Alba, highligh ing he im o ance of ecological e ea ch in info ming ag ic l al managemen a egie and eco em con e a ion e o [9,10].

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Cond c ema ic eld e o collec oil and lan am le f om Sina i Alba eld e e en ing a io ag ic l al e ing and na al habi a . Anal e oil am le o a e h icochemical o e ie ch a H, o ganic ma e con en , n ien le el , and mic obial comm ni com o i ion. Em lo molec la echni e ch a DNA e encing o iden if and an if decom o e comm ni ie , foc ing on bac e ia, f ngi, and o he mic oo gani m e en in he oil. U e oil e ac ion me hod (e.g., Bae mann f nnel echni e) o i ola e and iden if oo feede o la ion , incl ding nema ode and oil-d elling in ec . E al a e lan heal h a ame e , incl ding abo eg o nd bioma , oo mo holog , leaf chlo o h ll con en , and e damage m om , o an if he im ac of oo feede on Sina i Alba. Cond c labo a o and g eenho e e imen o a e Sina i Alba e i ance o oo feede , ing con olled infe a ion ial and moni o ing lan e on e o e ime. In e iga e he o en ial of mic obial inoc lan de i ed f om decom o e comm ni ie o enhance Sina i Alba e ilience o oo feede damage, ing inoc la ion e e imen nde con olled condi ion .

Anal e da a ing a o ia e a i ical me hod o a e he ela ion hi be een oil o e ie , decom o e comm ni ie , oo feede ab ndance, and lan o ec ion mechani m in Sina i Alba. De elo ecological model o im la e he d namic of decom o e - oo feede - lan in e ac ion in Sina i Alba eco em , in eg a ing eld da a and e e imen al e l o edic eco em e on e o en i onmen al change . En e e hical handling of lan and oil am le , adhe ing o ele an eg la ion and g ideline fo e ea ch in ol ing li ing o gani m and eco em . e e me hod and ma e ial ill enable a com ehen i e in e iga ion of he in e ac ion be een decom o e , oo feede , and lan o ec ion mechani m in Sina i Alba eco em , o iding al able in igh in o ecological d namic and ag ic l al ainabili .

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Soil anal i e ealed a ia ion in h icochemical o e ie among Sina i Alba eld , i h di e ence in H, o ganic ma e con en , n ien le el , and mic obial comm ni com o i ion in encing decom o e ab ndance and ac i i . Molec la iden i ca ion of decom o e comm ni ie highligh ed he e ence of di e e bac e ial and f ngal a a in Sina i Alba oil , i h a ia ion in comm ni com o i ion a ocia ed i h oil e and managemen ac ice . Soil e ac ion me hod de ec ed he e ence of oo feede

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o la ion , incl ding nema ode and oil-d elling in ec , i h highe ab ndance ob e ed in ag ic l al eld com a ed o na al habi a . E al a ion of lan heal h a ame e e ealed igni can di e ence in abo eg o nd bioma , oo mo holog , and leaf chlo o h ll con en be een Sina i Alba lan infe ed i h oo feede and ho e i ho infe a ion. Pe e i ance a a demon a ed a ing le el of e i ance among Sina i Alba geno e o oo feede damage, i h ome geno e e hibi ing highe ole ance and ed ced e damage m om .

Inoc la ion e e imen i h mic obial inoc lan de i ed f om decom o e comm ni ie ho ed o en ial bene fo enhancing Sina i Alba e ilience o oo feede damage, i h im o emen ob e ed in lan g o h and e e i ance in inoc la ed lan com a ed o non-inoc la ed con ol . e nding o ide in igh