附录 1　氮沉降对草地昆虫群落的作用及其影响因素

Appendix 1　Effects of nitrogen deposition on grassland insect community and influence factors

草地类型 Grassland types	施氮时间 Nitrogen application time	施氮强度 Nitrogen application intensity	昆虫类群 Insect groups	响应指标及作用方向 Response and effect direction	参考文献 References
草甸草原 Meadow steppe	4 个月 4 months	0, 10, 17.5 g N m^{-2} $year^{-1}$ 硝酸铵(NH_4NO_3)	直翅目(蝗虫) Orthoptera (grasshopper)	多度减少、性能降低 Decrease in abundance and performance	Zhu et al, 2019
	1 年 1 year	0, 13.3 g N m^{-2} $year^{-1}$ 有机肥 Organic fertilizer	鞘翅目(象鼻虫) Coleoptera (weevil)	多度减少 Decrease in abundance	Hancock et al, 2013
	2 年 2 years	0, 10, 30, 60, 90, 120 g N · m^{-2} $year^{-1}$ 硝酸铵(NH_4NO_3)	半翅目(叶蝉) Hemiptera (leafhopper)	多度增加 Increase in abundance	Prestidge, 1982
	26 年 26 years	0, 2.5 g N m^{-2} $year^{-1}$ NPK 复合肥(Synthetic fertilizer)	膜翅目(熊蜂) Hymenoptera (bumblebee)	多度减少 Decrease in abundance	Villa-Galaviz et al, 2021
典型草原 Typical steppe	3 个月 3 months	0, 100, 200 g N m^{-2} $year^{-1}$ 硝酸铵(NH_4NO_3)	膜翅目(瘿蜂) Hymenoptera (gall wasp)	多度减少 Decrease in abundance	Williams & Cronin, 2004
	4 个月 4 months	0, 10 g N m^{-2} $year^{-1}$ 尿素 Urea	直翅目(蝗虫) Orthoptera (grasshopper) 鳞翅目(毛虫) Lepidoptera (caterpillar) 半翅目(蚜虫) Hemiptera (aphid)	多度增加 Increase in abundance	Prather et al, 2021
	1 年 1 year	0, 5 g N m^{-2} $year^{-1}$ 硝酸铵(NH_4NO_3)	鳞翅目(毛虫) Lepidoptera (caterpillar)	多度、生物量增加 Increase in abundance and biomass	de Sassi et al, 2012a
	1 年 1 year	0, 17.5 g N m^{-2} $year^{-1}$ 硝酸铵(NH_4NO_3)	直翅目(蝗虫) Orthoptera (grasshopper)	多度减少、性能降低(生存率、生长率、体尺) Decrease in abundance and performance (survival rate, growth rate, body size)	Cease et al, 2012

草地类型 Grassland types	施氮时间 Nitrogen application time	施氮强度 Nitrogen application intensity	昆虫类群 Insect groups	响应指标及作用方向 Response and effect direction	参考文献 References
	2 年 2 years	0, 10 g N m^{-2} $year^{-1}$ 硝酸铵(NH_4NO_3)	直翅目(蝗虫) Orthoptera (grasshopper)	多度增加 Increase in abundance	Loaiza et al, 2011
荒漠草原 Desert steppe	4 个月 4 months	0, 3, 6, 10, 16, 28, 50, 80 g N m^{-2} $year^{-1}$ 硝酸铵(NH_4NO_3)	半翅目(蝽 叶蝉 蚜虫) Hemiptera (mirid bug leafhopper aphid) 鳞翅目(毛虫) Lepidoptera (caterpillar)	多度增加 Increase in abundance	Strauss, 1987
	1 年 1 year	0, 5.6 g N m^{-2} $year^{-1}$ 硝酸铵(NH_4NO_3)	半翅目(蝽) Hemiptera (true bug) 鞘翅目(叶甲) Coleoptera (leaf beetle)	多度增加 Increase in abundance	Cuesta et al, 2008
	14 年 14 years	0, 1, 2, 3.4, 5.4, 9.5, 17, 27.2 g N m^{-2} $year^{-1}$ 尿素 Urea	植食性昆虫 Herbivores 腐食性昆虫 Detritivores 寄生性昆虫 Parasitoids 捕食性昆虫 Predators	多度增加 Increase in abundance 多度减少、丰富度减少 Decrease in abundance and richness	Haddad et al, 2000
灌丛草地 Shrub grassland	2 年 2 years	0, 7.5 g N m^{-2} $year^{-1}$ 硝酸铵(NH_4NO_3)	半翅目 Hemiptera	多度增加、丰富度增加 Increase in abundance and richness	Hartley et al, 2003
	9 年 9 years	0, 1, 2, 5, 5.6 g N m^{-2} $year^{-1}$ 硝酸铵(NH_4NO_3)	鞘翅目(叶甲) Coleoptera (leaf beetle)	多度增加 Increase in abundance	Taboada et al, 2016
	9 年 9 years	0, 10 g N m^{-2} $year^{-1}$ 硝酸铵(NH_4NO_3)	半翅目(蝽 飞虱) Hemiptera (true bug planthopper)	多度增加 Increase in abundance	Richardson et al, 2002
	9 年 9 years	0, 0.5 g N m^{-2} $year^{-1}$ 硝酸铵(NH_4NO_3)	半翅目(蚜虫 粉蚧 角蝉) Hemiptera (aphid mealybug tree hopper)	多度增加 Increase in abundance	Grinath, 2021

草地类型 Grassland types	施氮时间 Nitrogen application time	施氮强度 Nitrogen application intensity	昆虫类群 Insect groups	响应指标及作用方向 Response and effect direction	参考文献 References
高山草地 Alpine grassland	1 年 1 year	0, 5 g N m^{-2} $year^{-1}$ 硝酸铵(NH_4NO_3)	膜翅目(寄生蜂) Hymenoptera (parasitic wasp)	多度增加 Increase in abundance	de Sassi et al, 2012b
	2 年 2 years	0, 5 g N m^{-2} $year^{-1}$ 硝酸钙铵 Calcium Ammonium Nitrate	鳞翅目(毛虫) Lepidoptera (caterpillar)	生物量增加 Increase in biomass	de Sassi & Tylianakis, 2012
高寒草甸 Alpine meadow	1 年 1 year	0, 2.8 g N m^{-2} $year^{-1}$ 硝酸铵(NH_4NO_3)	鳞翅目(毛虫) Lepidoptera (caterpillar)	多度减少、性能降低(生长和发育速率) Decrease in abundance and performance (growth, and development rate)	Yang et al, 2017
	8 年 8 years	0, 0.375, 1.5, 7.5 g N m^{-2} $year^{-1}$ 硝酸铵(NH_4NO_3)	鳞翅目(毛虫) Lepidoptera (caterpillar)	多度增加 Increase in abundance	Song et al, 2018
	8 年 8 years	0, 2.5, 5, 10 g N m^{-2} $year^{-1}$ 尿素 Urea	鳞翅目(毛虫) Lepidoptera (caterpillar)	多度增加 Increase in abundance	顾慧洁等, 2022
苔原 Tundra	24 年	0, 10 g N m^{-2} $year^{-1}$ 硝酸铵(NH_4NO_3)	半翅目(飞虱) Hemiptera (planthopper)	多度减少 Decrease in abundance	Asmus et al, 2018
盐沼 Salt marsh	3 个月 3 months	0, 10, 30, 60 g N m^{-2} $year^{-1}$ 硝酸铵(NH_4NO_3)	半翅目(飞虱) Hemiptera (planthopper)	多度增加、性能提高(存活率、体尺、发育速率) Increase in abundance and performance (survival rate, body size, growth rate)	Huberty & Denno, 2006
	1 年 1 year	0, 44.5 g N m^{-2} $year^{-1}$ 硝酸铵(NH_4NO_3)	半翅目(飞虱 盲蝽) Hemiptera (planthopper mirid bug)	多度增加 Increase in abundance	Gratton & Denno, 2003

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