

BIOLOGY AND DEVELOPMENT COMPARISON OF *ALTICA HIMENSIS* (COLEOPTERA: CHRYSOMELIDAE) ON BOTH INVASIVE ALIEN PLANT *RUMEX HASTATUS* AND NATIVE *IMPATIENS BALSAMINA* IN KASHMIR HIMALAYA

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The invasive alien plant species *Rumex hastatus* and a native plant species *Impatiens balsamina* are considered as obnoxious weeds present in the Kashmir valley covering major habitat types like orchards, agricultural fields and barren lands. The specialist native insect herbivore *Altica himensis* collected at field sites has a greater potential to act as bio control agent. Host specificity tests of no choice and dual choice revealed that *R. hastatus* and *I. balsamina* are only hosts of *A. himensis* egg and larvae. The egg oviposition and development of *A. himensis* larvae was found on these two plant species making them a realized host range. The developmental duration of *A. himensis* was faster on *R. hastatus* (57.27±2.03 days) as compared to *I. balsamina* (61.26±1.72 days) making the invasive alien plant an ideal host for this beetle. The beetle has a much greater potential to completely defoliate the host plant leading to mortality. The reduced number of leaves decreases the process of photosynthesis, slow plant growth, less production of flowers and ultimately lower seeds. This way the use of *A. himensis* at specific sites where the density of two plants is greater under controlled conditions can lead to eradicate the menace and subsequent seed bank in soil.

Key words: invasive alien plants, native insect herbivores, biological control, Kashmir Himalaya

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References

- Ahmad T., Rashid I., Ahmad R., Mehraj M., & Ahmad N. 2022. Alien plant and native herbivore network of Kashmir Himalaya. *Arthropod-Plant Interactions*, 16(5), 423–435.
- Bhat D.M. 2017. First report of *Rumex acetosa* L. as a host plant of *Altica himensis* Shukla (Coleoptera: Chrysomellidae) from Kashmir *Journal of Advanced Zoology*: 38(1): 79–81.
- Bezemer T.M., Harvey J.A., Cronin J.T. 2014. The response of native insect communities to Invasive plants. *Ann Rev of Entomol.* 59:119–141.
- Blossey B., Notzold R. 1995. Evolution of increased competitive ability in invasive nonindigenous plants: a hypothesis. *J Ecol.* 83:887–889.
- Blossey B., Schroeder D., Hight S.D., & Malecki R.A. 1994. Host specificity and environmental impact of two leaf beetles (*Galerucella californiensis* and *G. pusilla*) for biological control of purple loosestrife (*Lythrum salicaria*). *Weed Science*, 42(1), 134–140.
- Cavers P.B., & Harper J.L. 1964. *Rumex obtusifolius* L. and *R. crispus* L. *Journal of Ecology*, 52(3), 737–766.
- Culliney T.W. 2005. Benefits of classical biological control for managing invasive plants. *Crit Rev Plant Sci.* 24: 131–150.
- Dai H.J., Lu X.M., Zhang J.L., and Ding J.Q. 2014. Responses of a native beetle to novel exotic plant species with varying invasion history. *Ecological Entomology*, 39: 118–124.
- Frenzel M., & Brandl R. 2003. Diversity and abundance patterns of phytophagous insect communities on alien and native host plants in the Brassicaceae. *Ecography*, 26(6), 723–730.
- Hahn M.A., Schaffner U., Häfliger P., & Lüscher A. 2016. Establishment and early impact of the native biological control candidate *Pyropteron chrysidiforme* on the native weed *Rumex obtusifolius* in Europe. *BioControl*, 61(2), 221–232.
- Hatcher P.E., Brandsaeter L O., Davies G., Lüscher A., Hinz H.L., Eschen R., & Schaffner U. 2008. Biological control of *Rumex* species in Europe: opportunities and constraints. In *Proceedings 12th international symposium biology control weeds* (pp. 470–475).
- Hejerman M., Strnad L., Hejermanová P., & Pavlů V. 2014. Biological control of *Rumex obtusifolius* and *Rumex*

- crispus* by goat grazing. Weed Biology and Management, 14(2), 115–120.
- Hull-Sanders H.M., Clare R., Johnson R.H., Meyer G.A. 2007. Evaluation of the evolution of increased competitive ability (EICA) hypothesis: loss of defense against generalist but not specialist herbivores. J Chem Ecol 33:781–799.
- Jahner J.P., Bonilla M.M., Badik K.J., Shapiro A.M., Forister M.L. 2011. Use of exotic hosts by Lepidoptera: widespread species colonize more novel hosts. Evolution, 65(9): 19–2.
- Keane R.M. and Crawley M.J. 2002. Exotic plant invasions and the enemy release hypothesis. Trends Ecol. Evol. 17: 164–170.
- Keeler M.S., Chew F.S. 2008. Escaping an evolutionary trap: preference and performance of a native insect on an exotic invasive host. Oecologia, 156: 559–568.
- Khuroo A.A., Rashid I., Reshi Z., Dar G.H., Wafai B.A. 2007. The alien flora of Kashmir Himalaya. Biol Invasions 9(3): 269–292.
- Khuroo A.A., Reshi Z.A., Malik A.H., Weber E., Rashid I., Dar G.H. 2012b. Alien flora of India: taxonomic composition, invasion status and biogeographic affiliations. Biol Invasions. 14(1): 99–113.
- Mahendiran G., Dar M.A., & Akbar S.A. 2019. *Altica himalayensis* (Chen), an emerging pest of temperate horticultural crops from Kashmir valley. Halteres, 10, 7–18.
- Maron J.L., and Vila M. 2001. When do herbivores affect plant invasion? Evidence for the natural enemies and biotic resistance hypothesis OIKOS 95: 361–373.
- Martinkova Z., & Honek A. 2004. *Gastrophysa viridula* (Coleoptera: Chrysomelidae) and biocontrol of *Rumex*-a review. Plant Soil and Environment, 50(1), 1–9.
- Messing R.H., & Wright M.G. 2006. Biological control of invasive species: solution or pollution? Frontiers in Ecology and the Environment, 4(3), 132–140.
- Mehraj G., Khuroo A.A., Qureshi S., Muzafar I., Friedman C.R., & Rashid I. 2018. Patterns of alien plant diversity in the urban landscapes of global biodiversity hotspots: a case study from the Himalayas. Biodiversity and Conservation, 27(5), 1055–1072.
- Munshi A.H. 1975. An addition to Indian Polygonums from Northwestern Himalayas. J Bombay Nat Hist Soc 74:388–389.
- Munshi A.H., Javeid G.N. 1976. *Rumex plaustris* Sm. – a new record for India. Geobios 3:72.
- Munshi A.H., Javeid G.N. 1986. Systematic studies in Polygonaceae of Kashmir Himalaya. Scientific Publishers, Jodhpur, India.
- Mitchell C.E., Agrawal A.A., Bever J.D., Gilbert G.S. 2006. Biotic interactions and plant invasions. Ecology Letters 9: 726–740.
- Orians C.M., & Ward D. 2010. Evolution of plant defenses in nonindigenous environments. Annual review of entomology, 55(1), 439–459.
- Park J., Lee I.Y., Park J.E., & Kwon O. 2008. *Allantus lucifer* (Hymenoptera: Tenthredinidae), a candidate agent for the biological control of *Rumex* spp. Entomological Research, 38(3), 221–225.
- Parker J.D., Hay M.E. 2005. Biotic resistance to plant invasions? Native herbivores prefer non-native plants. Ecol Lett. 8: 959–967.
- Pathak R., Negi V.S., Rawal R.S., Bhatt I.D. 2019. Alien Plant Invasion in the Indian Himalayan Region; State of knowledge and research opportunities. Biodiversity and Conservation. 28: 3073–3102.
- Rather B.A., Hussain B., & Mir G.M. 2017. Seasonal Incidence and Biodiversity of Flea Beetles (Coleoptera, Alticinae) in a Brassicaceous Vegetable Agro-Ecosystem of Kashmir Valley. Entomological News, 127(3), 252–268.
- Razak N., & Ahmad I. 2020. Diversity of insects infesting medicinal and aromatic plants in the Kashmir Valley. In Biodiversity of the Himalaya: Jammu and Kashmir State, 801–820. Springer, Singapore.
- Reid CAM., & Beatson M. 2015. Disentangling a taxonomic nightmare: a revision of the Australian, Indomalayan and Pacific species of *Altica* Geoffroy, 1762 (Coleoptera: Chrysomelidae: Galerucinae). Zootaxa, 3918(4), 503–551.
- Rodgers W.A., Panwar H.S. 1988. Planning a wild life protected area network in India. 1988.
- Sekar K.C. 2012. Invasive Alien Plants of Indian Himalayan Region-Diversity and Implication. American Journal of Plant Sciences. 3: 177–184.
- Simberloff D., & Von Holle B. 1999. Positive interactions of nonindigenous species: invasional meltdown? Biological invasions, 1(1), 21–32.
- Stewart R.R. 1972. An annotated catalogue of the vascular plants of West Pakistan and Kashmir. Fakhri Press, Karachi, Pakistan.
- Sushilkumar. 1993. Biological control of forests and waste land weeds in India. Annals of Entomology 11(2): 131–153.
- Sushilkumar. 2015. History, progress and prospects of classical biological control in India. Indian Journal of Weed Science 47(3): 306–320.
- Sunny A., Diwakar S., Sharma G.P. 2015. Native insects and invasive plants encounters. Arthropod: Plant Interactions, 9(4): 323–331.
- Sun K.K., Yu W.S., Jiang J.J., 2019. Mismatches between the resources for adult herbivores and their offspring suggest invasive *Spartina alterniflora* is an ecological trap. J Ecol. 00: 1–14.
- Winston R., Schwarzlander M., Hinz H.L., Day M.D., Cock M.J., Julien M. 2014. Biological control of weeds: A world catalogue of agents and their target weeds.
- Xiaoshui W. 1991. *Gastrophysa atrocyanae* (Col: Chrysomelidae), an agent for biological control of the dock, *Rumex japonicus* (Polygonaceae) in China. International Journal of Pest Management, 37(4), 383–386.