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Short Communication

HYPERPARASITISM BY *Viscum monoicum* Roxb. ex DC. on *Dendrophthoe falcata* (L.F.) Ettingsh: A NOVEL CASE REPORTED FROM NEPAL

Mohan Prasad Devkota
Botany Department, Amrit Campus, Tribhuvan University, PO Box 102, Kathmandu, Nepal
Correspondence: mohanpdevkota@gmail.com

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ABSTRACT
A rare occurrence of *Viscum monoicum* Roxb. ex DC. (Viscaceae) on *Dendrophthoe falcata* (L.F.) Ettingsh. (Loranthaceae) has been reported as a novel case of incidental hyperparasitism for the first time from the tropical forests of Nepal.

Keywords: *Dendrophthoe falcata*, hyperparasitism, Nepal, *Viscum monoicum*

INTRODUCTION
The occurrence of one parasitic angiosperm upon another has been considered as one of the most remarkable coevolutionary relationships (D.L. Nickrent, personal communication, March 29, 2024). Infection of a mistletoe species on other mistletoes is of common occurrence (Visser, 1981) and such incidents have been reported in many literatures (Pundir, 1979; Thriveni *et al.*, 2010; Wiens & Calvin, 2011; Tennakoon *et al.*, 2014) which are generally considered as uniqueness in parasitism by others. In mistletoes, generally two common forms of such relationship can be distinguished, one is facultative, and the other one is obligate (Barlow, 2011). As suggested by Wiens and Calvin (1987) the term hyperparasite should be used to describe a facultative association between different parasite species. Whereas the obligate situation is called epiparasitism in which one parasitic species is parasitized by another to which it is related and share the common dispersal agents (Barlow, 2011). Epiparasitism is known to occur worldwide in both Loranthaceae and Viscaceae families and is most common in the tropics and subtropics in Paleotropics and Neotropics (Wilson & Calvin, 2017).

However, sometime a mistletoe occasionally infests another mistletoe species by chance depending upon the behavior of dispersal agent. This incidence does not necessarily show any indication of specificity or co-adaptation and is called incidental hyperparasitism. This is a common incidence occurring in Loranthaceae mistletoe which have a broad range of hosts in the forests of tropical and subtropical regions whereas it has been rarely reported from the temperate regions (Hawksworth & Wiens, 1996). Hyperparasitism in the family Viscaceae, especially in the genus *Viscum*, has also been reported on Loranthaceae mistletoes from the various parts of the world (Danser, 1941; Rao, 1957; Weeraratna, 1960; Pundir, 1979, 1981, 1989; Pundir *et al.*, 1994; Devkota & Glatzel, 2005; Thriveni *et al.*, 2010; Wiens & Calvin, 2011).

Here I report the occurrence of *Viscum monoicum* Roxb. ex DC. as an incidental hyperparasite on *Dendrophthoe falcata* (L.F.) Ettingsh. for the first time, from Nepal.

RESULTS
An interesting case of hyperparasitism was observed in May 2019, only on one occasion, from the RajaRam Community Forest of Chibbani Village in Susta Gaupalika, Ward No. 1, Nawalparasi District, Lumbini province of Nepal. *Viscum monoicum* (Viscaceae) was observed as a hyperparasite on *Dendrophthoe falcata* (Loranthaceae) in tropical *Shorea robusta* forest, located in the foothills of Chure range in the southern flat lands at 188m elevation between 27° 29' 12" N & 83° 51' 57" E.

D. falcata was observed as a commonly occurring mistletoe species infecting moderate size trees of *Shorea robusta* in a partially degraded and burnt tropical forest of Terai region having *Terminalia alata*, *Adina cordifolia*, *Schleichera oleosa* and *Lagerstroemia parviflora* as associated tree species and the large size bushes of *Murrya koenigii* as dominant ground vegetation.

Only one infection of *V. monoicum*, approximately 30cm across, was recorded infecting *D. falcata* (Fig. 1). The infected host branch of mistletoe *D. falcata* was 1.2cm in diameter (proximal) and 0.9cm in diameter (distal). The hyperparasite, *V. monoicum*, was attached to the host branch by forming round ball like primary haustorium measuring 1.7cm in diameter and rising 0.5cm above the host branch surface giving out two similar sized branches of 0.5cm in diameter (Fig. 2). Whereas the large bush of *D. falcata*, approximately 1m across, was recorded on the host branch of *Lagerstroemia parviflora* tree, measuring 8cm in diameter producing a large ball like primary haustorium with short but two robust epicortical roots towards basipetal direction. Entire bush of *D. falcata* was dying as the infected host branch of *Lagerstoremia parviflora* was also dying due to over exploitation of host branch by a large sized mistletoe thus jeopardizing the survival of hyperparasite.

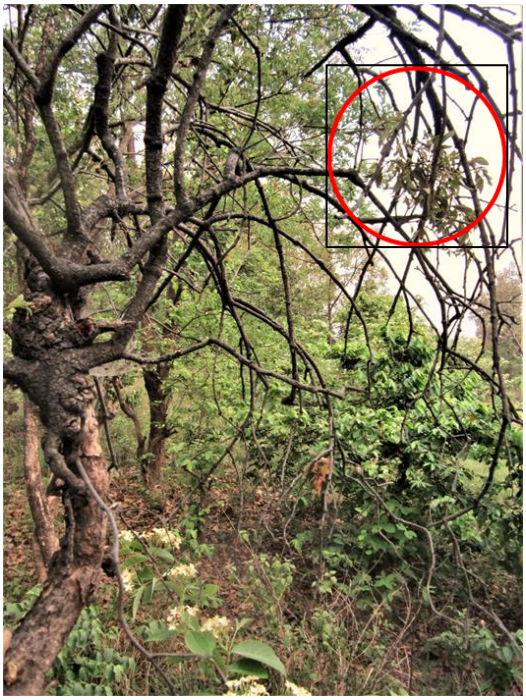

Figure 1. Hyperparasite *V. monoicum* (in circle) on *D. falcata* (leafless)

Figure 2. Haustorium of hyperparasite *V. monoicum* on infected branch of *D. falcata*

CONCLUSIONS

As reported from the other parts of the world, Genus *Viscum* has been successful in infesting a wider range of Loranthaceae mistletoes. The rare occurrence of *V. monoicum* infecting *D. falcata* was observed, for the first time, from the tropical forest of Chure region of Nepal and has been concluded it as a case of incidental hyperparasitism.

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