MIKANIA MICRANTHA KUNTH (ASTERACEAE) AS A POTENTIAL INVASIVE IN TERRESTRIAL AND WETLAND ECOSYSTEMS

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Abstract: Over the course of time, numerous introduced species have established in the Philippines and become invasive of which one is *Mikania micrantha* Kunth that gravely threatens the Philippine flora and fauna in both terrestrial and wetland ecosystems. This paper aims to address the taxonomic issues, understanding the biology, appraising the impact of *M. micrantha* in Philippine biodiversity and economy, and propose a holistic approach in controlling this weed by thoroughly examining reputable scientific journals. *M. micrantha* is a problematic invasive alien species indigenous to Central and South America listed as one of the most persistent weeds nationwide and worldwide. It threatens biological diversity by modifying ecosystem processes, reducing native species abundance through competition, altering community structure, and changing genetic diversity. Similarly, it can potentially affect Philippine economy as it significantly reduces yields of crops commonly grown by Filipinos. The success of its invasion is attributed to its capacity to reproduce sexually and asexually, adaptability, tolerance to some agricultural practices, high mobility, rapid growth and dormancy of propagules. Negligence of people in controlling it due to confusion in distinguishing *M. micrantha* to native *Mikania* species also contributes to the spread of this invasive species. Thus, it is essential to recognize the significance of taxonomy and understanding thoroughly the biology of a species in proposing a sound management strategy in combatting biological invasion.

Keywords: biology, biological invasion, management strategy, *Mikania micrantha*, taxonomy

Introduction:

Mikania micrantha Kunth is a notorious and persistent invasive species introduced in Asia-Pacific region and now recognized as one of the major weeds in the region. It is a perennial herbaceous vine under the family Asteraceae that is indigenous to Central and South America (Zhang et al. 2004) and is ranked among the top 100 worst invasive species globally (Lowe et al. 2001). Presently, *M. micrantha* is distributed in numerous countries in tropical Asia, parts of Papua New Guinea, Indian Ocean islands, Pacific Ocean islands and Florida in the U.S. (Zhang et al. 2004) where it has occupied cultivated lands,

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forestry zones and natural environments resulting to reduction in productivity and biodiversity (Waterhouse and Norris 1987). Moreover, *M. micrantha* has also invaded a wide range of agricultural and forest domains, banks of rivers and streams, roadsides and railway paths, pastures, and openly disturbed places (Zhang et al. 2004). Several countries have also reported it as a persistent nemesis in their plantations as it severely affects the growth and yield of various economically important crops.

With its widespread distribution, a variety of common names have been used to refer to *M. micrantha* which includes Chinese creeper, bitter vine, hemp vine, and mile-a-minute (PIER 2013). The common name mile-a-minute is most frequently used in Asia and South Pacific, however, the name "mile-a-minute" is shared with two other plant species under family Polygonaceae, namely: *Persicaria perfoliata* (L.) H.Gross and *Fallopia baldschuanica* (Regel) Holub. Thus, bitter vine is the favored common name for this plant. In the Philippines, *M. micrantha* may also be confused with the local name "bikas", which is a name used by the Tagalogs to refer to the native *Mikania cordata* (Burm.f.) B.L.Rob.

The extent of threat imposed by invasive species escalates globally as economic industrialization and international trade also rise (Lodge 1993) and Philippines is no excuse to that. Various research worldwide have shown that invasive alien plants such as *M. micrantha* causes decline in species richness and changes the structure of native community (Ding et al. 2007; Ehrenfeld 2010). And as a country regarded as biodiversity hotspot that is home to numerous native and endemic species of flora and fauna and as an agriculture-reliant nation, Philippines is seriously threatened by the invasion of alien species such as *M. micrantha*. One of the factors for its rapid invasion in its colonized areas is due to the limited understanding on its biology and confusion of its identity to other native *Mikania* species in the region that is fundamental in structuring a sound management strategy hence this comprehensive review.

The study specifically aims to:

- Understand the taxonomic issues of *Mikania micrantha* as a species;
- Elucidate the biology of *M. micrantha*;
- Appraise the potential impact of *M. micrantha* on biodiversity and economy;
- Propose a holistic management strategy to minimize the spread of *M. micrantha*.

Materials and methods:

A thorough review of various published and available literature in different reputable websites such as Google Scholar, Research Gate, JSTOR, and Academia regarding the taxonomy, biology and economic threats of *Mikania micrantha* Kunth were critically examined to analyze its establishment in the Philippines and assess its impact. The validity of scientific names was referred in International Plant Name Index (IPNI). Important databases such as Center for Agriculture and Biosciences International (CABI) and reputable scientific journals were utilized to gather the essential information in order to synthesize a holistic management approach that aims to minimize the rapid spread of *M. micrantha*.

Results and discussion:

Addressing taxonomic problems of *Mikania micrantha*

Mikania micrantha Kunth as a species, despite its very close resemblance to other relative *Mikania* species such as *M. scandens* and *M. cordata*, still has a unique and distinguishable morphological characteristic that can be used to delineate it from other species; hence, its determination as a species is based on the typological species concept. This concept is also the most appropriate

concept since this species can reproduce both through sexual and asexual means.

Mikania micrantha Kunth is a validly accepted name for bitter vine weed however this species has also multiple synonyms (Tab. 1). As a species, it is commonly mistaken with other relative species. As indicated by Parker (1972) and Holm et al. (1991), *M. micrantha* is typically misidentified with *Mikania cordata* (Burm.f.) B.L.Rob and *Mikania scandens* (L.) Willd. The erroneous identification of these species in earlier accounts has led to misleading claims.

Table no. 1 List of synonyms of *Mikania micrantha* Kunth retrieved from Plants of the World (Online)

Species name	Reference
Eupatorium denticulatum Vahl	Roskov et al. (eds.) (2018)
Eupatorium orinocense (Kunth) M.Gómez	Roskov et al. (eds.) (2018)
Eupatorium orinocense var. *batatifolium* M.Gómez	Govaerts et al. (2021)
Eupatorium orinocense var. *tamoides* M.Gómez	Govaerts et al. (2021)
Mikania cordata var. *indica* Kitam.	Koyama et al. (2016)
Mikania deltoides Poepp. ex Spreng.	Roskov et al. (eds.) (2018)
Mikania denticulata (Vahl) Willd.	Roskov et al. (eds.) (2018)
Mikania glechomifolia Sch.Bip. ex Baker	Roskov et al. (eds.) (2018)
Mikania micrantha var. *cynanchifolia* B.L.Rob.	Govaerts et al. (2021)
Mikania micrantha f. *hirsuta* B.L.Rob.	Roskov et al. (eds.) (2018)
Mikania micrantha f. *typica* B.L.Rob.	Govaerts et al. (2021)
Mikania orinocensis Kunth	Roskov et al. (eds.) (2018)
Mikania scandens var. *hirsuta* Hieron.	Roskov et al. (eds.) (2018)
Mikania scandens var. *subcymosa* (Gardner) Baker	Roskov et al. (eds.) (2018)
Mikania scandens var. *villosa* Hieron.	Roskov et al. (eds.) (2018)
Mikania sinuata Rusby	Roskov et al. (eds.) (2018)
Mikania subcrenata Hook. & Arn.	Roskov et al. (eds.) (2018)
Mikania subcymosa Gardner	Roskov et al. (eds.) (2018)
Mikania tamoides DC.	Roskov et al. (eds.) (2018)
Mikania umbellifera Gardner	Roskov et al. (eds.) (2018)
Mikania variabilis Meyen & Walp.	Roskov et al. (eds.) (2018)
Willoughbya heterophylla Small	Roskov et al. (eds.) (2018)
Willoughbya micrantha Rusby	Roskov et al. (eds.) (2018)
Willoughbya scandens var. *orinocensis* (Kunth) Kuntze	Roskov et al. (eds.) (2018)
Willoughbya variabilis Kuntze	Roskov et al. (eds.) (2018)

The *M. micrantha* is known to be a New World species, and it has only lately become completely apparent how widely distributed it is in the Old World. It was incorrectly identified as *M. scandens* or *M. cordata* in a large portion of the previous literature. The study of Holm et al. (1991) arguably claimed that *M. cordata* is the most aggressive of the three weed species, however this claim has been refuted and debunked by Choudhury (1972) and Parker (1972) since many of the earlier accounts of the distributions of *M. cordata* in literatures actually pertain to *M. micrantha*. Moreover, among the three species, only *M. micrantha* and *M. cordata* have occurrence in the Philippines. It is also important to note that while *M. micrantha* is regarded as invasive in the country, *M. cordata*, on the other hand, is native to the Philippines. With that, correct identification of these two species is becoming more vital as the other species possibly harbors native fauna as well.

Presence of *M. micrantha* in the country may adversely affect the population of its native counterpart. Therefore, skillfully distinguishing these two species is essential.

In Taiwan, according to Chen et. al. (2002), to verify the identity of two species, a molecular identification tool has been created to distinguish the invasive *M. micrantha* to native *M. cordata*.

As guide in identification, a dichotomous key for these three confused species is constructed in Table 2.

Table no. 2 Dichotomous Key for the Three Species of Genus *Mikania*

1	Petals pale purple…….....	*M. scandens*
	Petals white.....	2
2	Nodal appendage membranous	*M. micrantha*
	Nodal appendage not membranous, form furry appendages…….....	*M. cordata*

According to Holm et al. (1991), these species may be generally distinguished using these characteristics:

- *M. micrantha*: pappus whitish with 32-38 bristles, petals white, capitulum length 4.5-6 mm, nodal appendages membranous.
- *M. cordata*: pappus reddish with 40-45 bristles, petals white, capitulum length 7-7.5 mm, nodal appendages form furry appendages not membranous.
- *M. scandens*: pappus whitish with 30-35 bristles, petals pale purple, head length 5-7 mm.

Understanding the Biology of *Mikania micrantha*

Morphology and Reproductive Biology of *Mikania micrantha*

The phytography of *M. micrantha* is shown in Table 3. *M. Micrantha* is a creeping herb that can reproduce vegetatively through stem fragments and sexually through seeds (Choudhury 1972; Holm et al. 1991). Their flowers in corymbs (Fig. 1, Annexes) typically bloom during dry season, and it is probably due to the idea that flowering of *M. micrantha* is highly favored in open sunny areas than in shaded places (Hong et al. 2010), with plants producing between 90,000 and 210,000 seeds/m^2 (Zhang et al. 2003).

Cock (1982) even estimated that flowers account for 38.4–42.8% of all plant biomass. Their seeds are typically minute ranging from 1.85 by 0.42 mm in size, weighing 0.088 g/1,000 seeds and possessing a terminal pappus (Yang et al. 2005), increasing its surface tension and enabling its seed to be more effortlessly dispersed by the wind. Moreover, Yang et al. (2005) reported that this pappus also eases attachments to human clothing and equipment or to the animal furs facilitating human and animal dispersal. Furthermore, this pappus allows it to absorb more water consequently increasing germination rates.

Flowers of *M. micrantha* are known to be self-incompatible, hence the aid of insects or wind for effective pollination is essential (Li and Dong 2009). According to a study by Hong et al. (2007), insect pollination is essential for successful seed production because it increases the average number of seeds produced per ovule by 0.56 as opposed to 0.0034 and 0.0038 for flowers that were wind- or self-pollinated, respectively. In a study conducted in Fiji, it was found out that honeybees were the most efficient pollinators to *M. micrantha* flowers, however rainy seasons were believed to cause decline in the pollination rates of *M. micrantha* owing to reduced actions of pollinators (Macanawai et al. 2012a).

Vegetatively, *M. micrantha* normally reproduces by producing ramets that emerge from rosettes. Hong et al. (2010) research findings even imply that ramet reproduction may outpace seed production in forest gaps when flowering declines due to diminished light intensity or during rainy seasons that also impair insect activity (Macanawai et al. 2012b). Additionally, cut stems or stem nodes in contact with the soil's surface may cause resprouting (Day et al. 2012). Furthermore, the main stem can withstand drought for a number of years before reshooting under suitable conditions (Puzari et al. 2010). In a study conducted by Zhang et al. (2011) showing the adaptive ability of *M. micrantha* under dry and moist settings and its growth habit, it was observed that markedly climbing plants (85%) exhibited more seed production than prostrate plants (40%) which inclined to multiply vegetatively.

Table no. 3 Phytography of *Mikania micrantha*

Taxonomic characters	Descriptions
Habit	Creeping herb
Root System	Fibrous
Stem	Herbaceous, heavily branched, ribbed, and sparsely pubescent
Presence of culm	Absent
Leaf Type	Simple
Leaf Venation	Reticulated
Leaf Shape	Broadly ovate
Leaf Apex	Acuminate
Leaf Margin	Dentate
Presence of petiole	Petioles tenriliform, 2-9 cm long
Phyllotaxy	Decussate
Inflorescence type	Head in corymbose panicle
Flower	Minute, white to cream color; florets white or greenish; corolla mostly white and tubular; pappus or sepal, 32-38 barbellate
Sex of Flower	Bisexual
Symmetry	Actinomorphic
Ovary position	Inferior
Fruit Type	Achene, flattened, elliptic, 4-ribbed
Habitat	Terrestrial

Impacts of *M. micrantha* to economy and biodiversity

Uses of *M. micrantha*

Assessing how people use a weed species gives a picture as to how it flourishes and proliferates in local communities. Table 4 shows the different uses of *M. micrantha*.

Potential Impact of *M. micrantha* to agricultural commodities

M. micrantha is an agricultural weed that quickly grows and smothers a variety of plant species. Due to its quick growth, propensity to smother vegetation (Fig. 2-3, Annexes), and the impact of allelopathic chemicals in infested habitats (Li and Jin 2010), it seriously depletes crop yields. This weed often inhibits the growth of nearby crops thereby severely inflicting yield loss, and in worse cases, kills them (Day et al. 2012).

In a study conducted in China by Shen et al. (2013), *M. micrantha* was reported to be

invading important agricultural commodities like sugarcane, bamboo, lemon, banana and orange resulting in reduction of crop yield. Watson et al. (1964) also revealed that the girth of rubber trees in plantations with *M. micrantha* was found to be 27% thinner than those with leguminous ground covers in Malaysia. Furthermore, African oil palm infested by this weed yielded 20% less in comparison with crops free from it (Teoh et al. 1985). In India, infestations of *M. micrantha* in tea plantations significantly reduced its yield by 41% due to competition and disruption in the harvesting of new leaves (Puzari et al. 2010). Additionally, negative impacts of *M. micrantha* on bananas, cassava, citrus, coconut, coffee, guava, corn, papaya, pineapples, sweet potato, taro and yams were also reported (Waterhouse and Norris 1987; Abraham et al. 2002; Macanawai et al. 2010; Puzari et al. 2010; Day et al. 2012). *M. micrantha* also competes with pasture crops, leading to a drop in livestock production (PIER 2015). The creeping and climbing habit of *M. micrantha* permitted it to cover a bamboo plantation over a number of other weeds stunting them and disrupting their development (Widjaja and Tjitrosoedirdjo 1991). This can lead to significant financial losses due to decline in productivity and increased cost of control. The control of this invasive species is very costly which is supported by a study in Malaysia that revealed that an estimated amount of US$ 9.8 million was spent to control this for their rubber and cacao plantations (Teoh et al. 1985).

Table no. 4 Uses of *M. micrantha* worldwide

Uses	Country	References
Fodder for sheep and cattle	India, Malaysia, Fiji	Wirjahardja 1976; Puzari et al. 2010; Macanawai et al. 2012b; Tripathi et al. 2012; PIER 2015
Green manure to rice	India	Abraham and Abraham 2006; Sankaran 2007; PIER 2015
Poultice for snake, insect and scorpion bites	India	https://www.cabidigitallibrary.org
Cure for cuts and nausea	Fiji, Samoa, Papua New Guinea	Day et al. 2012; Macanawai et al. 2012b
Topical ointment for hornet, bee and ant stings		Parham 1958; Sankaran 2007; PIER 2015
Rat poison	Ecuador	Holmes 1975
Cover crop	India, Malaysia, Taiwan	https://www.cabidigitallibrary.org

Economic impact of this highly invasive species is limitedly known in the Philippines due to the limited attention it gets from the government and research community. However, research from neighboring countries revealed its adverse effects to agricultural commodities and even in livestock industry. And notably, most of the aforementioned crops reported to be unfavorably affected by this weed are also economically important commodities grown by Filipinos for their living and the cost for controlling it would require tons of money for the government and local farmers.

Potential Threat to Philippine Biodiversity

Philippines is known to be a mega-diverse country (Mittermeier et al. 1997), home to more than 10.107 described plants (Barcelona et al. 2013) and 1.9% of the world's endemic plant and vertebrates are found here (Myers et

al. 2000). Additionally, more than 57% of the major faunal and floral groups in the Philippines, according to Oliver and Heaney (1996), are unique to the country. Furthermore, Philippine archipelago also ranks fifth plant species diversity and preserves 5% of the world's flora with very high species endemism however it is greatly challenged by several threats such as biological invasion.

M. micrantha as an invasive alien species, if successfully established in natural or semi-natural ecosystem, may threaten native biological diversity (IUCN 2000). Invasive alien species modify community structure (Hejda et al. 2009) and ecosystem processes (Powell et al. 2011), reduce the abundance and richness of indigenous species through competition, predation, hybridization, and other indirect effects (Gaertner et al. 2009), and cause shift in genetic diversity (Ellstrand and Schierenbeck 2000). *M. micrantha* endangers the natural ecosystem by decreasing species richness particularly the native species diversity (Kaur et al. 2012). It is also reported that this species has the capacity to modify the chemistry of the soil and mineral recycling which in turn disturbs microbial populations in the soil (Wong 1964). It can be found creeping in damp clearings in lowland forest, streams and roadsides, pastures, along fence-lines, along edges of forests, in plantation areas and even in wastelands. *M. micrantha* was also observed to invade aquatic habitats such as ponds, covering and killing aquatic fauna (Zhang et al. 2004). It is detrimental to other species because it blocks the light and smothers them eventually killing them. Moreover, it competes for water and nutrients and secretes chemicals which prevent the growth of its competitor.

However, there is relatively little information in the Philippines about the impact of *M. micrantha* and statistics are typically based on anecdotal reports implying that native species suffer from competition, predation, habitat modification, and parasitism (Joshi 2006). Due to a lack of information in its actual impact to Philippine biodiversity, its threat in the Philippines is not fully recognized.

Proposal of Holistic Management Strategy

The control of *M. micrantha* is challenging attributed largely to its reproductive biology, capacity to reproduce sexually and asexually, adaptability to different environments, tolerance to some agricultural practices, high mobility, rapid growth and the capacity of its propagules to remain dormant. Not only that, the difficulty in distinguishing *M. micrantha* apart from native *Mikania* species is also contributory to the problem thus correctly identifying it in the field is imperative prior to its control.

Framing a feasible control measure to combatting this kind of biological invasion requires a community-wide effort. Various agricultural practices from other affected countries that can be adopted in the Philippines is shown in Table 5. Selecting the best management practices for this species is circumstantial as one control is not always better than the other and often one control works better if integrated with other measures.

Using cultural control, the establishing of an herb layer in areas such as orchards, forests, perennial crops, parks, and newly developed areas can prevent the growth of *M. micrantha*. According to Zhang et al. (2004), establishment of herb layer inhibits the seed germination of *M. micrantha* by elevating the understory shade in the area thereby making the condition for the weed less favorable. Also, allowing domesticated livestock to graze in areas heavily infested by this weed can be a simple remedy; however, its acceptability and the hazard it may cause to the animals should be considered as this plant may have allelochemicals that might have adverse effects on the body of the animals. Grazing of sheep in rubber plantations severely infested by *M. micrantha* and several other weeds allowed farmers to save 15-25%

for the overall weed control in Malaysia (Arope et al. 1985).

The use of traditional manual method, hand-pulling, can also be remedial. Simply employing slashing would not be a feasible control for this species as cut stems may still resprout thus uprooting it would be most practical. Zhang et al. (2004) reported that hand-pulling *M. micrantha* prior to seed maturity or during rainy season has been found effective as numerous dying trees subsequently recovered from the heavy infestation of *M. micrantha.* Additionally, plowing of fields using machineries as control a priori sowing has also been found efficient, which could be attributed to the fact that *M. micrantha* is typically destroyed and/or buried by plowing (Macanawai et al. 2010).

Table no. 5 Effective control strategies worldwide potentially adoptable in the Philippines

Practices	Country	References
Establishment of an herb layer	Southern China	Zhang et al. (2004)
Grazing of livestocks	Malaysia	Arope et al. (1985)
Uprooting of *M. micrantha* prior to maturity of its seeds	China	Zhang et al. (2004)
Utilization of machinery to plow fields as control prior to sowing	Fiji	Macanawai et al. 2010
Introduction of *Puccinia spegazzinii*	Taiwan, Fiji, Papua New Guinea	Ellison and Day 2011; Day et al. 2013
Judicious application of standard post-emergence herbicides such as 2,4-D, paraquat and glyphosate employed in early stage of *M. micrantha*	Malaysia, Indonesia	Ahmad-Faiz (1992); Teng and The (1990); Mangoensoekarjo (1978)

For ages, *M. micrantha* has been a target for biological programme however incompabilities have hindered its success from different countries where it was introduced and some of the potential biocons are also pest to other important crops. Albeit, the biocon agent, *Puccinia spegazzinii*, has shown potential in controlling *M. micrantha* and its introduction to different countries has yielded various results. The introduction of *P. spegazzinii* in India around 2005 to 2006 (Ellison and Day 2011) and in mainland China in 2006 (Fu et al. 2006) failed to establish, however, in 2008, its establishment in Taiwan (Ellison and Day 2011), Fiji and Papua New Guinea was an outstanding achievement where the rust is reported to cause significant reduction in the growth and cover of *M. micrantha* by about 50% (Day et al. 2013). Nonetheless, its potential in the Philippines is not guaranteed as its establishment in the country has not been known and reported yet.

Finally, chemical control is still vital as it gives immediate result however judicious application must be employed. The vulnerability of the early stages of *M. micrantha* to common post-emergence herbicides like 2,4-D, paraquat, and glyphosate provides the foundation for chemical control in the majority of plantation crops. As a weed, *M. micrantha* is frequently found in rubber and oil-palm plantations and the peak of weed competition occur when crop was still at its juvenile stage. Eradicating *M. micrantha* from immature oil palm completely guarantees normal growth of the trees.

Conclusions:

Mikania micrantha Kunth is an invasive species regarded as a perennial problem in the Philippines and neighboring countries in the Asia-Pacific region. Despite its status as a problem, there is still little information about its taxonomy, biology, impacts in the country and ultimately, its control, hence this review. This review emphasizes the appraisal of the threats of *M. micrantha* in the Philippines in relation to the recognition of taxonomy as integral component of the problem and understanding its biology in framing a holistic management approach to this pest problem.

This review revealed that one of the fundamental causes of the widespread invasion of *M. micrantha* in the world is partly attributed to incorrect identification of this invasive species due to its close resemblance to the native *Mikania* species. This negligence in recognizing *M. micrantha* as a problem in the community has paved the way for it established itself and continuously colonized more vulnerable areas. Without immediate attention, this species will continue to flourish and spread its range. This scenario highlights the significance of taxonomy in addressing biological invasion.

Furthermore, understanding the reproductive biology and ecology of species also plays a vital role in realizing the potential threats of invasive species. This paper shows that one of the reasons for the successful invasion of *M. micrantha* is greatly attributed to its biology. Its adaptability to wide range of conditions particularly in areas with higher temperature, rainfall, organic matter, relative humidity and intense sunlight is exceptionally advantageous and it hugely affects the natural ecosystem by depleting species richness chiefly the native species diversity. Its ability to reproduce both sexually and vegetatively depending on the environmental conditions greatly favored its success. The structure of its seed through its pappus also assisted in its dispersal to farther places. And ultimately, its rapid growth and dormancy are also contributory to its success.

Finally, this paper provides insights on potential management strategies based on the success stories of neighboring countries in providing solutions to the problem. However, there is still a lot of research needed in order to fully understand and mitigate this problem especially on the assessment of its danger to both economy and biodiversity in the Philippines. There is also a dire need in tracing the current distribution of this species in the country. Likewise, it is recommended that we search for potential biological control native to the country.

Rezumat:

MIKANIA MICRANTHA KUNTH (ASTERACEAE) CA POTENȚIAL INVAZIVĂ ÎN ECOSISTEMELE TERESTRE ȘI UMEDE

De-a lungul timpului, numeroase specii introduse s-au stabilit în Filipine și au devenit invazive, dintre care una este *Mikania micrantha* Kunth, care amenință grav flora și fauna filipineză, atât în ecosistemele terestre, cât și în cele din zonele umede. Această lucrare își propune să abordeze problemele taxonomice, să înțeleagă biologia, să evalueze impactul *M. micrantha* asupra biodiversității și economiei filipineze și să propună o abordare holistică în controlul acestei buruieni prin examinarea amănunțită a revistelor științifice de renume. *M. micrantha* este o specie exotică invazivă problematică, originară din America Centrală și de Sud, catalogată ca fiind una dintre cele mai persistente buruieni la nivel național și mondial. Amenință diversitatea biologică prin modificarea proceselor ecosistemice, reducerea abundenței speciilor native prin competiție, modificarea structurii comunității și schimbarea diversității genetice. În mod similar, poate afecta economia filipineză, deoarece reduce semnificativ randamentul plantelor cultivate în mod obișnuit de filipinezi. Succesul invaziei sale este atribuit capacității sale de a se reproduce pe cale sexuată și asexuată, adaptabilității, toleranței

la anumite practici agricole, mobilității ridicate, creșterii rapide și latenței propagulelor. Neglijența oamenilor în ceea ce privește controlul acesteia din cauza confuziei în ceea ce privește distincția dintre *M. micrantha* și speciile native de *Mikania* contribuie, de asemenea, la răspândirea acestei specii invazive. Astfel, este esențial să se recunoască importanța taxonomiei și a înțelegerii temeinice a biologiei unei specii pentru a propune o strategie de gestionare solidă în combaterea invaziei biologice.

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Annexes:

Figure no. 1 Inflorescence of a *Mikania micrantha* Kunth in USM, Kabacan, Cotabato

Figure no. 2 *Mikania micrantha* smothering the creeping vegetations in a fence in Brgy. New Abra, Matalam, Cotabato

Figure no. 3 *Mikania micrantha* smothering a banana plant in Brgy. New Abra, Matalam, Cotabato