International Journal of Advanced Research in Engineering Technology & Science
ISSN: 2349-2819
Email: editor@ijarets.org Volume-6, Issue-7 July- 2019 www.ijarets.org

Recent review on prospectives of *Uraria picta (L.)*

Tara Chandra Ram

Department of Botany, Mahatma Gandhi Central University, Motihari Bihar

ABSTRACT *Uraria picta* L. (2n=22) is a critically endangered perennial herb (family Papillionaceae), have strong therapeutic potency used for its analgesic, anti inflammatory, anti-cancerous, hepato-protective, anti diabetic, antioxidant, aphrodisiacs and fracture healing properties due to presence of flavones (Rhoifolin). Its root is an ingredient of Dashmula (ten root herb) drug. Due to increasing demand by pharmaceutical and herbal drug industries and over exploitation from its wild sources, its population diminishing from natural habitat and becomes threatened and rare and categorized as endangered by IUCN red data book.

Key words: *Uraria picta***,** Economic traits, Non random mating, Allele frequency, Heritability, Rhoifolin

Introduction:

Uraria picta L.(2n=22) is a perennial herb belonging to the family Papillionaceae, possessing dwarf habit, widely distributed throughout Bangladesh, India, Sri Lanka, Tropical Africa, Malay Islands and the Philippines (Kirtikar et al., 1993; Yusuf et al., 1994). The fruits and pods are effective against oral sores in children and the roots against cough, chills and fever (Kirtikar et al., 1993; Yusuf et al., 1994). It is one of the important plants in ten herb formulations called 'Dashmula, a well established Ayurvedic drug of the Indian system of medicine for treating general fatigue, oral sores and several gynecological disorders. *U. picta* have strong therapeutic potency mainly used for its analgesic, anti inflammatory, antioxidant, aphrodisiacs and fracture healing properties. Main content of *U. picta* is flavonoid (rhoifolin). Different parts of the plants are reported for different activities such as, decoction of the entire plants is useful for cough, chill and fever etc., leaves for the treatment of gonorrhea, and for contractions of the uterus leading to abortion (Anislie, 1937) *It* is also used in treating malaria (Adegoke et al., 1968). Thus, the major bioactive flavonoid viz. rhoifolin has been considered as marker compound for qualitative standardization of *U. picta* based on liquid chromatographic analysis. This plant is also categories threatened species in red list of IUCN (Groom, A. 2012).

Herbal market scenario: Presently, 95% raw materials required by pharmaceuticals and drug manufactures are collected from the wild sources (Kehimker, 2000). Raw material may be the any parts of plants viz. leaves, roots, fruits, bark, stems, rhizomes, seeds, flowers, plant juices, extract or whole plant. The world demand for the plant-based medicines is increasing day by day due to their safety, quality and effectiveness. WHO estimated that about 50% population of developing countries rely on traditional medicine mostly plant drug for their

primary health care and present demands is approximately US$ 14 billion per year (Kala, 2006, Sharma, 2010). India is also a major exporter of medicinal herb and their extracts. The country exported a total of 42000 tones of medicinal plant raw materials to other countries during the year 2000-2001 (Sarin, 2003). In India, the medicinal plant related trade is estimated to be approximately US $ 1billion per year (Joshi et al., 2009). In 2008, India exported medicinal plants worth US $ eight billion dollars, 60% was in crude form, while 30% was in the form of finished products. Rest of them was partially prepared products (Malik et al., 2011). The requirement of higher production of raw materials, secondary metabolite, bioactive compounds, drugs and medicines, etc. not enough as in Indian population ratio. The medicinal properties of plant species have made an outstanding contribution in the origin and evolution of many traditional herbal therapies. *Uraria picta* is a herb and herbal demand is increasing day by day. Many medicinal plants in India viz. ashwagandha, isabgol, kalmegh, sarpgandha, turmeric, prishnparni, chirayita, etc. are restricted to the traditional and ethno botanical uses among tribal's and villagers. Due to increasing demand day-by-day in pharmaceutical and herbal industries, it is need to know the scientific basis of the chemical constituents present in ignored medicinal species. There are many other potential causes of rarity in medicinal plant species, such as habitat specificity, narrow range of distribution, land use disturbances, introduction of non-natives, habitat alteration, climatic changes, heavy livestock grazing, explosion of human population, fragmentation and degradation of population, population bottleneck, and genetic drift (Kala, 2005, 2006; Weekley and Race, 2001). IUCN as well as proceedings of a few regional meetings on this topic have helped to understand the relative abundance or scarcity of various medicinal plant species including the rare, threatened, endangered, or species about to become extinct (Salleh et al., 1997; Anon, 1994,1998, 2005; Gautam et al., 1998; Tandon et al., 2001 Owing to the need and global resurge of herbal medicine creates a huge pressure on the plant population which is naturally grown in the forest used for the pharmaceutical industries, *U. picta* plant enlisted in IUCN as rare and threatened plant. On the huge population of India, the medicines and drugs so costly behind this reason are not large-scale exploitation and availability of raw materials for pharmaceutical company. The biggest problem in India is that restricted areas of R and D of some selected medicinal plants for examples India have many biospheres reserve, mega biodiversity, hot spot among that many globally and endemic important medicinal and aromatic plants are present still they are ignored for Rand D agencies.

Drug formulation of *Uraria picta* root:

In Ayurvedic medicine, "*Dasamula*" (10 roots of different plant herb) plants are a top traded group and their annual demand is >1000 Metric Tons (MT). *Dasamula* group of plants are integrated in a number of Ayurvedic

formulations like *Dasamula Rasnadikwath, Dasamuladi ghrita, Dasamularishta, Dasamuladikwatha,* and *Dasamula Haritaki leha.* Roots of *Prsniparni* are one of the 10 ingredients of the *Dasamula* group of plants (Chunekar, 2004). Roots of *Prisniparni* are used in formulations other than of *Dasamula* of Ayurveda such as *Amrtarishta*, *Sirah, suladi,vajra, rasa,* etc., and in many instances also used as single drug (*Dasamula taila*, *Dasamularishta*). *U. picta* is a ingredient of Dasmula, not only root is important but its leaves, stems, pods, fruits are also important so that is why our effort to increase whole herbage of the plants.

Need for genetic improvement for avoiding overexploitations:

Due to demand in pharmaceutical/ herbal industries and over exploitation from wild sources, population of *U. picta* diminishes from nature and becomes threatened and rare plant, needs attention to work on its genetic improvement for development of high yielding chemovar/ genotype/variety for large scale cultivation by growers. High economic yielding genotypes/chemovars/varieties are the outcomes of creating mutational genetic variability' These high yielding varieties solve the problems of the global demand to producing herbal products for drugs and pharmaceutical industries. In absence of desirable variants among available genetic stock of *U. picta*, phenological changes which are useful have been induced in identified accessions/ genotypes by mutagen treatment including, disease resistance, early maturing, changes in leaf shape and size, increased number of flowers and flower colours. Due to changes in petal color, the flavonoid content as well as new flavonoids and alkanoid automatically increases not only in flowers but also in roots, stems, leaves. Recently described the use of Illumina sequencing and single-nucleotide polymorphism analysis in multidimensional pools as a method for efficient mutation discovery. Using molecular marker technology like SSR when combined with quantitative genetics methodology has provided additional insights into gene action, and gene flow in mutants. Enhancement of gene frequency wills also the major finding of elite lines of mutant which also elucidates the evolutionary biology and natural selection process. During the studies the development of mutant lines plays a key role and key aspects in genetics, cytogenetics and molecular biology. Due to creation of mutations, the chromosome behavior, morphology, homologous chromosome pairing, and more chiasmata formation are automatically exhibit wide range of variability. This results a significant variation of mutant plant with reference to normal plants. In mutant line due to radiation shows a polygenic trait and pleotropic trait development. Due to this type of gene functioning the significant increase in alleles frequencies in mutant line shows a great gene pool resulting a heterosis and hybrid vigour formation in mutant lines, also there are a automatic formation of more secondary metabolites, isoflavonols, flavonoids in the various parts like root, stem, flower and seed and perhaps the formation new anthocynins in the petals of *Uraria picta.*

Ethnobotany:

Traditionally, the plant is used as an antidote to the venom of a dangerous Indian snake, *Echis carinata*. Its leaves are a good antiseptic and are used against gonorrhea. The fruits and pods are effective against oral sores and the roots against cough, chills and fever. *Uraria lagopoides* has been reported for its analgesic and anti-inflammatory activity (Akhilesh et al 2009, Mishra 2009). Four species of *Uraria* recrorded in flora of Taiwan (Hiroyoshi and Yu, 2007.) *Uraria* species is reported to contain flavones, isoflavones, triterpenes and steroids (Rahman et al 2007). *U. critina* for nitric oxide-scavenging and antioxidant effects (Yen et al., 2001). Comparative pharmacognosy of *U. picta* has been studied (Lalitha et al 2012).

Two isoflavanones 5,7-dihydroxy-2'-methoxy-3',4'-methylenedioxyisoflavanone, and 4',5'-dihydroxy-2',3'-dimethoxy-7-(5-hydroxychromen-7yl)-isoflavanone along 6 compounds including isoflavanones, triterpenes and steroids were isolated from roots of *Uraria picta*. The structures of these compounds were established unambiguously by UV, IR, MS and a series of 1D and 2D NMR analysis (Mishra 2009). Meiotic chromosome preparation, chromosome number confirmation (2n= 22) and secondry chromosome association were made and suggested by Bhattacharya and Datta (2010). An isocratic RP-LC method was developed for the quantification of rhoifolin in *Uraria picta*.

Pharmacological activity:

Aqueous and methanolic extracts of *Uraria picta* was evaluated for its Acaricidal properties in laboratories using human and domestic animal model. The total and fractionated extracts have been assessed for acaricidal activity on *Lxodes ricinus*. The results indicated that methanolic extract of this plant was more potent acaricide compared to the aqueous extract (Igboechi at al 1989). Comparative evaluation of Aqueous and methanolic extracts of roots of A*sparagus racemosus* and whole plants of *Uraria picta* were studied for anti-inflammatory activity using *in-vitro* and *in-vivo* animal models. Results indicated that the *Uraria picta* has better anti-inflammatory potential than *Asparagus racemosus* (Ahirrao et al 2007). Alcoholic and aqueous extract of aerial part of *Uraria lagopoides* inhibited the edema compared with indomethacin and showed marked analgesic activity in mice ($P<0.01$) compared with acetylsalicylic acid (Hamid et al 2007). An Indian herbomineral preparation containing *Uraria picta* as one of the ingredients was studied to investigate the hypolipidaemic activity of Abana, (Khanna et al 1991). Analgesic activity of *Uraria lagopoides* has been reported using mice in acetic acid induced writhing test (Igboechi et al 1989). Antimicrobial activity of isoflavones isolated from *Uraria picta* has been reported against both Gram +Ve and Gram –Ve bacteria and fungi using cup late method

and micro dilution techniques (Kirtikar et al.1993). Protective effect of aqueous extract of *Uraria Picta* on nephrotoxicity in rats was studied (Kale et al 2012). Laboratory evaluation of the acaricidal properties of *Uraria picta* extracts has been studied (Igboechia et al 1989).

References

Adegoke, E, Akinsanya, A, Nagu, A. (1968). Studies of Nigerian Medicinal Plants. A preliminary survey of Plant Alkaloids. J. West Afr. Sci. Assoc. 13:13-39.

Ahirrao, P, Jagtap, A, Shirke, S, Fernandes, B. Comparative assessment of anti-inflammatory potential of Asparagus racemosus and *Uraria picta* Life Sciences 2007 proc life sciences; Poster Communications :PC108

Akhilesh, KY, Deepti, Y, Karuna S, Ram, KV, Ajit, KS, Madan, MG. Flavone glycoside Based Validated RP-LC Method for Quality Evaluation of Prishniparni (*Uraria picta*) Chromatographia 2009;69:653-658

Anislie, JR, Imperial Forestry Institute (1937). A list of plants used in native medicine in Nigeria. Oxford. University of Oxford.

ANON. (2005): IUCN Congress highlights medicinal plants. – Plant Talk 39: 7.
Anon, K,1994. Ethanobotany in the search for new drugs. Ciba Foundation Sybposium, John Wiley and Sons, New York 188.

Anonymous, Report of the Task force on conservation and Sustainable use of Medicinal Plant, Government of India Planning Commission; 2012.

Anonymous, Conservation and development of medicinal plants, Agri export zone, cebeco India private limited our partner in Agri-buisness;2010.

Bentley, A, MacLennan, B, Calvo, J. and Dearolf, C.R. (2000) Targeted recovery of mutations in Drosophila. Genetics, 156, 1169– 1173.

Bhattacharya, A, Datta, AK. Secondry chromosome association in Uraria picta (Jacq) DC (Family : Leguminosae). Cytologia, 2010a; 75:37-40. and — 2010b. *Uraria picta*: An Overview. Medicinal Aromatic Plant Sci. Biotech. 4: in press.

Bhattacharya, A, Datta, AK. A Report on genetic male sterility in Uraria picta (Jacq) Cytologia, 2011;76:55-62.

Bhattacharya, A, Datta, KA. Karyomorphology and chromosome number confermation in *Uraria picta* (Jacq) DC. Chunekar, KC 2004 Bhavaprakasa Nighantu of Bhavamishra Chaukhambha Bharati Academy, Varanasi.

Colbert, T, Till, BJ, Tompa, R, Reynolds, S, Steine, MN, Yeung, AT, McCallum, CM, Comai L, Henikoff S (2001) High-throughput screening for induced point mutations. Plant Physiol 126:480–484

Gautam, PL, Raina, R, Srivastava, U, Raychaudhari, SP, Singh, BB (eds). 1998. Prospects of medicinal plants. Proceedings of UHF-IUFRO International workshops on prospects of medicinal plants. Indian Society of Plant Genetic Resources, New Delhi, India.

Greene, EA, Codomo, CA, Taylor, NE. et al. (2003) Spectrum of chemically induced mutations from a large-scale reverse-genetic screen in *Arabidopsis.* Genetics 164:73 [-740

Groom, A, 2012. *Uraria picta*. The IUCN Red List of Threatened Species 2012: e.T19891465A20159472.

Hiroyoshi, O, Yu, I. A revision of Uraria in Taiwan, 2007, Taiwania :52: 177-183

Igboechia, AC, Osazuwaa, EO, Igwea, UE. 1989. Laboratory evaluation of the acaricidal properties of extracts from *Uraria picta* (Leguminosae). Journal of Ethnopharmacology 26(3): 293-298.

Joshi, K, Chavan, P, Warude, D. 2009. Molecular markers in herbal drug technology.*Current Science*. 87: 159-165.

Kehimkar I. 2000. In: Common Indian Wild Flowers. Bombay Natural Historical Society. Oxford University Press.

Kala, CP. Indigenous uses, population density, and conservation of threatened medicinal plants in protected areas of the Indian Himalayas. Conservation Biology. 2005;19:368–378.

Kala, CP. 2006. Developing the medicinal plant sector in north India; challenges and opportunities J.Ethnobotanical&Ethnomedicinal : 1-24.

Kale, R H, Halde, U K, Biyani, K R. Protective Effect of Aqueous Extract of *Uraria Picta* on Acetaminophen Induced Nephrotoxicity in Rats Vol. 3 (1) International Journal of Research in Pharmaceutical and Biomedical Sciences 2012.

Kirtikar, KR, Basu, BD, Indian Medicinal plants. 1993.

Lalitha, S, Adams, SJ, Deepthi, PM, Krishnamurthy, KV, Padma V. Comparative pharmacognosy of medicinal plant species used as *Prsniparni*. Int J Green Pharm 2012;6:303-9.

Malik, AR, Siddique, MAA, Sofi, PA, Butola, JS, Ethnomedicinal Practices and Conservation Status of Medicinal Plants of North Kashmir Himalayas. *Research Journel of Medicinal Plant*: 2011;1-15.

Mishra, DN, Medicinal plant for treatment of fever in the Madhava chikitsa tradition of medicine, Ind J of Trad know 2009; 8:352-361

Michael, J, Pelezar JR. Textbook of Microbiology. Fifth edition. Pp.504

Patra, N K, Kumar, B. (2005). Improved varieties and genetic research in medicinal and aromatic plants (MAPs). Proc. Second National Interactive Meet on Medicinal and Aromatic Plants, Lucknow (India), CIMAP, 53–61

Oleykowski, CA, Bronson, Mullins, CR, Godwin, AK, Yeung, AT. (1998) Nucleic Acids Res 26: 4597-4602

Rahman, MM, Gibbons, S, Alexander IG. Isoflavanones from *Uraria picta* and their antimicrobial activity. Phytochemistry. 2007; 68:1692–1697.

Rigola, D, vanOeveren J, Janssen, A, Bonné, A, Schneiders, H, van der Poel HJ, van Orsouw, N.J, Hogers, RC, de Both MT, and van Eijk MJ. (2009) High-throughput detection of induced mutations and natural variation using KeyPoint technology.PLoS One 4: 4761.

Salleh, MK, S Natesh, Osman, A, Kadir, AA. (eds). 1997. Medicinal and aromatic plants: Strategies and technologies for conservation. Proceedings of the Symposium State-ofthe- Art Strategies and Technologies for Conservation of Medicinal and Aromatic Plants. Kuala Lumpur, Malaysia, 29-30 September 1997. Ministry of Science,Technology and Environment, Malaysia and Forest Research Institute, Malaysia.

Sarin,YK, Medicinal plants raw materials for Indian drug and pharmaceutical industry 1. An appraisal of resourses . J.Indian forester, 2003; (1): 3-24.

Sato, Y, Shirasawa, K, Takahashi, Y, Nishimura, M, Nishio, T. (2006) Mutant selection from progeny of gamma-ray-irradiated rice by DNA heteroduplex cleavage using Brassica Petiole extract. Breed Science 56:179-183

Sharma, AB, 2010. Global medicinal plants demend may touch $ 5 trillion by 2050. *Indian Express*.

Taiwania, 52(2): 177-183, 2007 A Revision of Uraria (Leguminosae) in Taiwan Hiroyoshi Ohashi(1,3) and Yu Iokawa(2)

Tandon, V, NK, Bhattarai, M, Karki. (eds). 2001. Conservation assessment and management plan workshop report on selected medicinal plant species of Nepal., 18-20 January 2001, Pokhara, Nepal. Medicinal and Aromatic Plants Programme in Asia (MAPPA), IDRC and Ministry of Forests and Soil Conservation, Nepal.

Till, B.J, Burtner, C, Comai, L. and Henikoff, S. (2004a) Mismatch cleavage by single-strand specific nucleases. Nucleic Acids Res. 32, 2632–2641.

Weekley, CW, Race, T. The breeding system of *Ziziphus celata* Judd and D.W. Hall (Rhamnaceae), a rare endemic plant of the Lake Wales Ridge, Florida, USA: implications for recovery. Biological Conservation. 2001;100:207–213.