TRADESCANTIA ZEBRINA: A PROMISING MEDICINAL PLANT

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Abstract: Tradescantia zebrina Heynh. ex Bosse syn. Zebrina pendula Schnizl. (Family- Commelinaceae), commonly known as 'Wandering Jew' is an important medicinal plant with several traditional medicinal uses in many countries around the world. Previous reports on the plant have demonstrated significant pharmacological activities such as anticancer, antioxidant, antibacterial, antitrypanosomal, antiarrhythmic and larvicidal activity against Anopheles benarrochi. However, only a few phytoconstituents have been reported by previous researchers. T. zebrina is a valuable source of traditional medicine for treating kidney diseases. The plant needs additional research attention because of its wide ethnomedicinal applications and reports on promising biological activities. The present paper compiles the information available from all possible scientific sources which may help the researchers to explore the possible biological activities of this relatively less known plant.

Keywords: Tradescantia zebrina, Traditional uses, Phytochemistry, Bioactivity

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INTRODUCTION:
The family Commelinaceae comprises of 37 genera and over 600 species of monocotyledonous herbaceous flowering plants [1, 2] including the genus *Tradescantia* that consists of approximately 70 species [3]. *Tradescantia zebrina* Heynh. ex Bosse syn. *Zebrina pendula* Schnizl. (Fig. 1), commonly known as ‘Wandering Jew’ is a herbaceous perennial plant with creeping shoots and fleshy leaves. The leaves are purple green in colour with broad, silvery stripes and purple undersides, simple, alternate, ovate with entire margin. Flowers are purple-pink and periodically throughout the year, fruits are ovaland about less than 0.5 inch [4, 5]. The plant is native to the Gulf Coast region of eastern Mexico but naturalized in various parts of the world. It thrives well in a variety of soils and commonly distributed as a weed of waste areas, roadsides and forests in sub-tropical and warmer temperate regions [6, 7].

Fig. 1. *Tradescantia zebrina* Heynh. ex Bosse [7]

METHODS:
Extensive literature survey from all available scientific sources was performed using electronic search engines such as Google and scientific publishing sites such as PubMed, Elsevier etc. Other literature sources included papers published in official websites, international journals, and conference papers. Taxonomy [8]

<table>
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<th>Table 1: Worldwide ethnomedical uses of <em>T. zebrina</em></th>
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<td><strong>Country</strong></td>
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<td>Jamaica</td>
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<td>Mexico</td>
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<td>Afro-Cuban Santeria</td>
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<td>Malaysia</td>
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Kingdom: Plantae
Subkingdom: Tracheobionta
Super division: Spermatophyta
Division: Magnoliophyta
Class: Liliopsida
Subclass: Commelinidae
Order: Commelinales
Family: Commelinaceae
Genus: Tradescantia L.
Species: *Tradescantia zebrina* Heynh. ex Bosse

TRADITIONAL USES:
The plant is highly valued in various traditional systems of medicine. The plant is commonly known as ShuiGui Cao (Water Turtle Grass) by the Chinese where the plant is highly recommended for patients suffering from kidney disease to improve their kidney function. About 200 g of the whole herb along with 15 pieces of red dates and 12 slices of ginger are boiled in 1.5 liters of water and the decoction is recommended to consume in empty stomach or 2 to 3 hours after food for achieving best results [9]. In Jamaica, the plant is used for treatment of high blood pressure, coughs and tuberculosis. The plant is used to purify the blood, the leaves applied to reduce swellings, hemorrhoids, blood in the stools and taken orally to treat kidney infections. In Mexico, a beverage made of lemon and sweetened decoction of leaves, commonly called ‘Matalli’, is used as a cold tonic drink [10]. In Afro-Cuban Santeria, decoction of leaves is drunk to flush gravel out of the kidneys and bladder, break the crisis of colitis, and provoke menstruation [11]. In Guyana, leaves are used as tea for cleansing blood and treating influenza [12]. The plant is also used to treat gastrointestinal disorders [13]. In Malaysia, the decoction of the plant is recommended to be a remedy to improve the kidney function. The plant is also believed to be beneficial in the treatment of poisonous snake bite, leucorrhoea, urinary infection, nephritis and inflammation [9].
PHYTOCHEMISTRY
Reports on the isolated compounds from this plant are scarce. Few phytoconstituents reported by earlier researchers include 3-ecdysone, β-sitosterol, 3β, 5α, 6β-trihydroxy stig mast and succinic acid [14, 15].

BIOACTIVITY
Anticancer activity
A study reported the antitumor activity of β-sitosterol, 3β, 5α, 6β-trihydroxystig mast and succinic acid in ascites-type-180 sarcoma of mice. The compounds revealed significant inhibition of tumor growth [14]. The anticancer activity of T. zebrina and T. fluminensis was reported [16]. The assays were preformed to measure the doubling time and clonogenic survival of SCC-13y (squamous cell carcinoma), HFF-1 (human foreskin fibroblasts), and A549 (lung adenocarcinoma) cells. Results of the study showed that cancer cell proliferation was decreased with the addition of T. zebrina treatment confirming the general inhibitory effects of the test extract on cancerous and non-cancerous cells. The aqueous and a methanol extracts of T. zebrina were screened for possible anticancer activity against two cancer cell lines namely, A-549 lung carcinoma cells and SCC-13y malignant keratinocyte cells [17]. The counting of cells was done over a five day period in order to determine the inhibition of cell growth. Results of the study revealed decreased cell growth in both the cell lines. Further, the extracts were also treated on a non-cancerous cell line of HFF-1 human foreskin fibroblasts cells to determine the relative toxicity of the extracts. The study showed inhibitive effects of T. zebrina extracts on both cancerous and non-cancerous cells.

Antioxidant activity
As per study performed by Tan et al. [18] they investigated antioxidant capacity of the methanol extract of the leaves of T. zebrina using different methodological approaches. The antioxidant activity was studied by determining the total phenolic content, total flavonoid content, total tannin content, DPPH free radical scavenging, ferric reducing power and ferrous ion chelating assays. The results revealed significant antioxidant activity of the extract. In another study, Cheah et al. [19] reported the antioxidant activity of the methanol extract of the leaves of T. zebrina. The antioxidant activity was studied by determining the total phenolic content, total flavonoid content, and DPPH free radical scavenging assays. The results also supported previous studies and revealed significant antioxidant activity of the extract.

Acetylcholinesterase inhibitory activity
Cheah et al. [19] reported the acetylcholinesterase inhibitory activity of the methanol extract of the leaves of T. zebrina by using acetylcholine iodide as substrate. Based on the results obtained, the extract at 100 µg/ml and 10 µg/ml showed significant inhibition on the activity of acetylcholinesterase (p<0.05) up to 14% and 15.3% respectively with respect to the control group.

Antibacterial activity
As per the antibacterial activity study done by Tan et al. [18] on the methanol extract of the leaves of T. zebrina, the extract revealed promising antibacterial activities against Bacillus cereus, Bacillus subtilis, Micrococcus luteus, Methicillin-Resistant Staphylococcus aureus, Staphylococcus epidermidis, Enterococcus faecalis, Aeromonas hydrophila and Proteus vulgaris respectively.

Antitrypanosomal activity
González-Coloma and co-researchers [20] reported the antitrypanosomal activity of T. zebrina. The plant was extracted with hexane, chloroform, and 70% ethanol-water and the extracts were tested upon epimastigote forms of Trypanosoma cruzi strain Y. The extracts revealed promising antitrypanosomal activity.

15-lipoxygenase inhibitory activity
The 15-lipoxygenase inhibitory activity of the methanol leaf extracts of T. zebrina using spectrophotometric assay by observing the increase in absorbance at 234 nm due to the formation of the product 13-hydroperoxyoctadecadienoic acid was reported by Alaba and Chichioco-Hernandez [21]. The results revealed that the extract can inhibit the 15-lipoxygenase pathway involved in asthma attacks.

Antiarrythmic activity
Chunxin et al. [15] reported the antiarrythmic activity of 3-ecdysone using aconitine as an inducer of arrhythmia in animals. The compound revealed significant antiarrythmic activity.

Insecticidal activity
Iannacone and Pérez [22, 23] reported the insecticidal activity of the tea extract of T. zebrina against Anopheles benarrochi. The results of the study showed promising insecticidal activity with LC50 value of 0.86% at 24 h exposure.

CONCLUSION:
Medicinal plant species have always remained as important alternatives to conventional medicines in...
developing countries, especially within poor communities that inhabit rural areas and lack access to health as well as the source for identification of active chemicals and formulation into pharmaceutical dosage forms. *T. zebrina* is relatively lesser-known, yet important medicinal plant that is used in several traditional systems of medicine all over the globe. For medicinal uses, *T. zebrina* is primarily collected from wild sources. The plant possess promising antioxidiant activity and thus its traditional use in the form of a cold tonic drink a tea 'Matali' in Mexico is justified. It is therefore worthy of further investigation and promotion as an herbal tea. At present, the plant needs more attention by the researchers.

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REFERENCES:


22. Iannacone J, Pérez D. Insecticidal effect of Paullinia clavigera var. bullata Simpson (Sapindaceae) and Tradescantia zebrina Hort ex Bosse (Commelinaceae) in the control of Anopheles benarrochi Gabaldon, Cova García & López 1941, main vector of malaria in Ucayali, Peru. Ecol Aplicada 2004; 3: 64-72.