

Palabras clave: Residuos, pesticidas, Las Playitas, suelos agrícolas

Abstract

Pesticides levels were evaluated in soils for agricultural use, located in the watershed of Zarzales, Las Playitas parish, Municipality of Rivas Davila, Merida State, used to cultivate potato (*Solanum tuberosum*), carrot (*Daucus carota*) and scallions (*Alliums choenoprasum*). Pesticides were extracted by Soxhlet using EPA Method 3540C (EPA, 1996) and quantification was performed by high resolution liquid chromatography with diode detector (HPLC-DAD) according to a previously validated method. High detection frequency were observed in soils where carrots and potatoes, were cultivated, showing 13 of the 17 pesticides studied. In soil cultivated with carrot, the highest pesticide levels were found in the initial (27.91 mg/kg) and middle (32.39 mg/kg) stages; followed by potato-cultivated soil with 26.22 mg/kg at the beginning, and 28.16 mg/kg in the middle stage. In soils cultivated with scallions, 9 of the 17 pesticides were detected, showing high pesticide levels in the middle (19.11mg/kg) and final (20.67 mg/kg) stages; this behavior is due to the prolonged harvest time in order to obtain greater profitability. According to that reported in the literature, weather conditions (low temperature) and the physicochemical characteristics (high percentage of total organic matter, elevated pH and FA - FAa texture) of the soils in the area, help the retention of the studied pesticides. Pesticides found in higher concentrations and more frequent detection in all crops were paraquat (21.95 mg/kg in carrots-cultivated soils), carbendazim (15.60 mg/kg) and mancozeb (4.54 mg / kg) in scallion-cultivated soils. According to Spains legislation, these soils are contaminated, with pesticides due to the fact that the soils of the three studied crops exceeded the acceptable daily intake (ADI) for the three active substances found in high concentrations. Throughout the upper basin of Mocoties river, the same type of agricultural practice is carried out, thus it is probable that the described situation is the same throughout the whole area of Rivas Davila Municipality, affecting the quality of the environment and the health of the population.

Keywords: pesticides, residues, agricultural soils

PROPUESTA DE RESTAURACIÓN ECOLÓGICA CON BASE EN LOS PRINCIPIOS DE FORESTERÍA ANÁLOGA PARA LA ZONA AMORTIGUADORA DEL PNN TATAMÁ EN EL MUNICIPIO DE SAN JOSÉ DEL PALMAR (CHOCÓ), COLOMBIA

*ECOLOGICAL RESTORATION PROPOSAL BASED ON
THE PRINCIPLES OF ANALOG FORESTRY FOR THE
BUFFER ZONE OF THE PNN TATAMÁ IN THE
MUNICIPALITY OF SAN JOSÉ DEL PALMAR, CHOCÓ
COLOMBIA*

Resumen

La Zona Amortiguadora del Parque Nacional Natural (PNN) Tatamá en jurisdicción de municipio de San José del Palmar (Chocó, Colombia), sufre de manera constante la degradación de la cobertura boscosa debido a la expansión de la frontera agrícola y pecuaria, la explotación comercial de los recursos forestales y los cultivos ilícitos. Como respuesta a esta problemática socioambiental se diseñaron en este trabajo los principales elementos de una propuesta de restauración y recuperación con base en los principios de la Forestería Análoga (FA) para cuatro reservas naturales campesinas de la sociedad civil (Reserva Natural La Florida (RNLF), Reserva Natural La Esperanza (RNLE), Reserva Natural La Divisa (RNLD), Reserva Natural La Miranda (RNLM)) ubicadas en las cuatro veredas que conforman dicha zona amortiguadora, teniendo como el objetivo central crear sistemas productivos o de conservación en áreas donde existen suelos degradados o que necesitan conservación, sistemas que deben resultar familiares a las sociedades tradicionales que hacen uso de los bosques. Forestería análoga es un término que se define en Senanayake (1987) "... como un sistema de gestión forestal que tiene por objeto establecer un ecosistema dominado por árboles que sea análogo en estructura arquitectónica y función ecológica al sistema original clímax o sub-comunidad de la vegetación clímax". Por lo tanto FA se convierte en un mecanismo alternativo para la restauración de la biodiversidad y para la organización del territorio, partiendo de la comprensión de las actividades antrópicas de explotación de los recursos, las cuales provocan, generalmente, una degradación producto de la implementación de prácticas inadecuadas de manejo.

Sobre la base de una revisión exhaustiva de las teorías y análisis que sustentan a la FA como estrategia de recuperación y producción, se diseñó una herramienta para caracterizar, diagnosticar y planear las actividades y uso de los recursos de un predio agropecuario, con aspectos técnicos fundamentales de las evaluaciones estructurales y ecológicas convencionales, y herramientas participativas. Dicha metodología fue estructurada con cinco grandes pasos como lo son: A) Información socioeconómica de la zona amortiguadora; B) Información Fisiológica de la vegetación natural (Reserva Natural Campesina); C) Información sobre la unidad productiva (Reserva Natural Campesina); D) Valoración ecológica del paisaje forestal en la zona amortiguadora del PNN Tatamá y E) Diseño del sistema análogo. De manera complementaria se diseñó un índice de esfuerzos de restauración, a través del cual se constató que Reservas poseen una situación ambiental y productiva más amigable, y por lo tanto requieren menor número de estrategias y unas actividades más sencillas hacia la restauración, como también por su grado de intervención, cuando y qué camino tomar para revertir condiciones desfavorables. La valoración ecológica de los ecosistemas naturales y los sistemas productivos de las cuatro reservas, expresaron la necesidad de priorizar esfuerzos en la reconversión y mejoramiento de las zonas de pastoreo y monocultivos, de la mano de estrategias de mitigación buscando bajar la presión sobre los ecosistemas naturales, fomentar la conectividad entre los mismos y asegurar la permanencia de los procesos ecológicos.

Palabras clave: forestería análoga, restauración ecológica, zona amortiguadora

Abstract

The forest cover in Tatamá National Park's buffer zone in San José del Palmar (Chocó, Colombia), has been significantly diminished due to the expansion of agricultural and fishing industries, commercial forestry and illicit crop cultivation.

In response to this socio-environmental quandary, the main components of a restoration and recuperation proposal were set forth based on the Analog Forestry (AF) principles of four rural nature reserves located within the buffer zone surrounding the park. These four reserves, which were created solely for rural civil society, are Reserva Natural La Florida (RNLF), Reserva Natural La Esperanza (RNLE), Reserva Natural La Divisa (RNLD), and Reserva Natural La Miranda (RNLM). The goal is to create production systems or conservation areas in places where the soil has degraded or where conservation is needed. These production systems should be familiar to the traditional societies that make use of the forests. Analog Forestry was coined by Senanayake (1987)"... as a forest management style that seeks to establish a forest type environment, analogous in architectural structure and ecological function to the site's original climax or sub-climax vegetation". Therefore, AF has become an alternative mechanism for biodiversity restoration and territorial organization based on the understanding of human exploitation of natural resources, which generally causes environmental degradation due to inappropriate management practices.

Based on a comprehensive review of the theories and analysis that support AF as a recovery and production strategy, a tool was designed to characterize, diagnose and plan activities and resource use of agricultural land, with fundamental technical aspects of structural and conventional ecological assessments, and participatory tools.

This methodology has five major components: A) Socioeconomic data from the buffer zone; B) Physiognomic Information of the natural vegetation (on the Rural Nature Reserves created for civil society); C) Information on productivity (on the Rural Nature Reserves created for civil society); D) Ecological assessment of forest landscape in Tatamá Park's buffer zone and E) Analog system design. Likewise, an index of design restoration efforts was developed which found that reserves have a more environmentally friendly and productive impact, and thus require fewer and less complicated restoration strategies, intervention efforts, and identified when and which methods were appropriate in order to reverse unfavorable conditions. The ecological assessment of the natural ecosystems and production systems of these four reserves demonstrated the need to prioritize reconversion and improvement efforts of grasslands and monocultures; to support mitigation strategies which reduce human acts harmful to natural ecosystems and instead promote connectivity between them, and ensure long-term ecological practices.

Keywords: Analog forestry, ecological restoration, buffer zone

**EVALUACION DE LAS AMENAZAS POR
CRECIDAS DEL RIO MOCOTIES EN TOVAR Y
SANTA CRUZ DE MORA, CON ESPECIAL ENFASIS
EN EL EVENTO HIDROMETEOROLÓGICO DE
FEBRERO DE 2005**