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Life strategy and chemical composition as predictors of the selection of medicinal plants from the *caatinga* (Northeast Brazil)

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Abstract

An ethnobotanical study was undertaken in conjunction with a phytochemical approach to the medicinal flora of the *caatinga*, popularly used in communities of the Xingó region (Northeast Brazil); the focus was on applying the apparency theory to explain the choice and use of these plants. Initially, an ethnobotanical study was carried out to survey the medicinal plants used in the region in which 339 people were interviewed using standardized questionnaires. To eliminate the effect of cultural interference, exotic plants cultivated intentionally were not considered, which resulted in a total of 41 species. In the field, data was obtained on the types of life strategies and habit for each species and plant parts indicated for medicinal use were collected. A phytochemical study was undertaken with five classes of chemical compounds for the species collected. Significant differences were found in the number of positive occurrences for each of the compound classes in relation to life strategy

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and habit. Strategist-*K* plants had a greater number of occurrences than strategist-*r* plants. In general, trees were more diversified than herbs and bushes in relation to the presence of compound classes. The scores (local relative importance) obtained for each plant are independent from compound classes found, habit, life strategy, and plant part used. Nevertheless, strategist-*K* species obtained the highest averages.

Keywords: Phytochemistry; Dry forest; *Caatinga*; Ethnobotany; Apparency theory

1. Introduction

Several researchers have drawn attention to the use of medicinal plants in tropical regions, discussing different hypothesis to explain the usage patterns found (Voeks, 1996; Stepp and Moerman, 2001; Stepp, 2004). The information available today makes clear the role of plants' life form and ecologic biochemistry for the local use and knowledge of medicinal resources. Stepp and Moerman (2001) and Stepp (2004), for example, observed a high frequency of herbs and weeds used as medicinal in several parts of the world, suggesting that this preference might be related with chemical and ecological aspects. However, cultural factors, in conjunction with the previously cited usage patterns, strongly influence the selection and use of medicinal plants (cf. Nolan and Robbins, 1999; Amorozo, 2004; Vandebroek et al., 2004).

As a model, the authors above suggest the apparency (Feeny, 1976) and resource availability theories (Coley et al., 1985), initially used in herbivory studies. Both have some predictions in common, supported by the idea that weeds and herbs are high in strongly active secondary compounds. In reality, these theories are complementary and share some predictions (Howe and Westley, 1988). Rhoades and Cates (1976) postulate that there is a greater investment in defense in apparent plants and that these plants developed chemical defenses that are either quantitative or that act as digestibility reducers (tannins, for example); non-apparent plants, however, would accumulate qualitative defenses (glycosides, for example), present in low concentrations in tissues and with low metabolic cost (Piazzamiglio, 1991).

Therefore, *r*-strategist species, which colonize rapidly and have a short life cycle, tend to invest in the quality (mobile defenses) of the defense compounds and not on the quantity (Coley et al., 1985); there is a link between lifespan and type of defense, based on the fact that annual plants are more toxic than perennials—this toxicity is important in the species used as medicinal plants. One example is *Catharanthus roseus* (L.) G. Don., an annual species considered a weed, which produces vincristine and vinblastine, drugs used in chemotherapy to treat some types of cancer (Stepp and Moerman, 2001; Stepp, 2004).

These theories would explain the great number of herbs among medicinal floras. Considering the poorly investigated medicinal flora of seasonal dry forests, especially the *caatinga* of northeastern Brazil (for example, Almeida and Albuquerque, 2002; Albuquerque and Andrade, 2002), this study tested two hypotheses: (a) chemical compounds considered strongly bioactive tend to concentrate themselves in species