PRESENCE AND USES OF WILD GRAPEVINE (*VITIS* SPP.) IN THE CENTRAL REGION OF VERACRUZ IN MEXICO

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Abstract

Aim: The aim of this study was to localize and conserve wild grapevines (*Vitis* spp.) in the central area of the State of Veracruz, Mexico and to record their uses.

Methods and results: The wild grapevines were localized in the central area of the State of Veracruz using GPS, and information on local uses was obtained by interviewing people. A total of 63 wild grapevines were localized and propagated. They were found from 20 m to 2,664 m altitude. The morphological traits (i.e. leaf shape and colour) of the vines differed from one another. A number of uses was recorded, such as production of juice to alleviate health problems, wine, desserts and hair shampoo.

Conclusion: The differences in the morphology of the genotypes indicate a great biodiversity of the genus *Vitis* in the area considered. Several uses for wild grapevines were found.

Significance and impact of study: The exploration of *Vitis* spp. in the area studied raises the possibility of finding new hybrids or multi-hybrids between species. Wild grapevines could be used to produce natural products that could be sold on the market.

Key words: *Vitis* spp, wild grapes, neglected fruit, Mexican grapevines, plant uses, Mexican lianas

Résumé

Objectifs : L'objectif de cette étude était de localiser et de conserver de la vigne sauvage (*Vitis* spp.) dans la zone centrale de l'État de Veracruz, au Mexique et de référencer son utilisation.

Méthodes et résultats : Les vignes sauvages ont été localisées dans la zone centrale de l'Etat de Veracruz, au moyen d'un GPS, et des informations sur leurs usages ont été obtenues en interrogeant les populations locales. Au total, 63 vignes sauvages ont été localisées et propagées. Elles ont été localisées de 20 m à 2 664 m d'altitude. Les vignes diffèrent entre elles sur le plan des traits morphologiques (c'est-à-dire la forme et la couleur des feuilles). Un certain nombre d'utilisations, comme la production de jus pour atténuer des problèmes de santé, le vin et la fabrication de desserts et shampoing, ont été registrées.

Conclusion : Les différences dans la morphologie des génotypes ont montré l'existence d'une grande biodiversité de l'espèce *Vitis* dans la zone considérée. Plusieurs utilisations pour les vignes sauvages ont été trouvées.

Signification et impact de l'étude : La recherche de *Vitis* spp. dans la zone étudiée met en lumière la possibilité de trouver de nouveaux hybrides ou plusieurs hybrides entre les espèces. Les vignes sauvages pourraient être utilisées pour obtenir des produits naturels qui pourraient être vendus sur le marché.

Mots-clés : *Vitis* spp, raisins sauvages, fruits négligés, vignes du Mexique, utilisation des plantes, lianes mexicaines

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Table 1 - Counties in the State of Veracruz that were selected to be explored for the presence of wild grapevine and localization, vine number, and coordinates [latitude (N), longitude (W) and altitude (m)] of the wild grapewines (*Vitis* spp.) that were found.

County	Coordinates and altitude	
Alpatlahuatl	1. 19º06'2.7" 97º07'46.4" 2281m	2. 19º06'0.8" 97º07'35" 2,237 m
	3. 19º06'2.7" 97º06'48" 2,147 m	4. 19º06'01" 97º06'14" 1,923 m
	5. 19º06'14.5" 97º05'42.8" 2,009 m	6. 19º06'13.4" 97º05'23" 2,010 m
	7. 19º06'27.1" 97º05'3.5" 1,835 m	
Atlahuilco	1. 18º41'39.1" 97º50'33.0" 1,807 m	2. 18º41'39.1" 97º50'28.5" 1,774 m
	3. 18º 42' 48.9" 97º 40' 59.3" 1,749 m	
Calcahualco	1. 19º 07' 27.9" 97º 05' 23" 1,754 m	2. 19º 07' 30.3" 97º 05' 22.7" 1,752 m
Cardel	1. 19º 28' 1.3" 96º 20' 19.1" 22 m	2. 19º 28' 1.5" 96º 20' 19.2" 20 m
	3. 19º 28' 1.1" 96º 20' 17.9" 28 m	4. 19º 27' 54.9" 96º 20' 2.2" 25 m
Coatepec	1. 19º25'53.1" 96º57'44.2" 1,122 m	2. 19º 25"54.1' 96º57"43.2" 1,131 m
	3. 19º 25' 51.11" 96º 57' 45.5" 1,118 m	4. 19º 26' 96º 57' 20" 1,200 m
Comapa	1. 19º10"4.5" 96º52'29.9" 1,042 m	2. 19º10'4.9" 96º52'28.6" 1,028 m
	3. 19º10"5.2" 96º52'28.9" 1,030 m	4. 19º10'5.3" 96º52'29.4" 1,026 m
	5. 19º10'5.0" 96º52"33.0" 1,045 m	6. 19º 09'00" 96º49'2.5" 990 m
Cosautlan	1. 19º 23' 11.6" 96º 59' 45.7" 1,242 m	2. 19º21'17.1" 97º01'30.7" 1422 m
	3. 19º 19' 27.4" 96º 58'35.3" 1,142 m	
Coscomatepec	1. 19º 03'49.2" 97º06'43.4" 1,946 m	2. 19º 03'48.9" 97º07'3.7" 1,975 m
	3. 19º03'48" 97º07'04" 1,975 m	4. 19º 03'49.6" 97º07'4.3" 2,000 m
	5. 19º03'5.7" 97º10'44.2" 2,664 m	6. 19º 03'15.9" 97º09'55.6" 1,547 m
Chocaman	1. 19º 00'50.1" 97º20'37.7" 1,522 m	2. 19º00'55.6'' 97º02'40" 1,635 m
	3. 19º 00'56.4" 97º 02'41.9" 1,677 m	
Huatusco	1. 19º10'24.9" 96º57'46.2" 1,382 m	2. 19º10'24.6" 96º57'45.6" 1,368 m
	3. 19º10'24.8" 96º57'46.1" 1,368 m	4. 19º05'42.8" 96º01'3.5" 1,380 m
Iztaczoquitlán	1. 18º52'45.5" 97º00'19.8" 1,192 m	2. 18º52'43.7" 97º00'19.6" 1,192 m
	3. 18º52'42.7' 97º00'19.1" 1,192 m	4. 18º52'42.5" 97º00'19.4" 1,195 m
	5. 18º52'41.5" 97º00'19.3" 2,001 m	6. 18º52'41.1' 97º00'19.1' 2,006 m
	7. 18º52'34.6'' 97º00'17.7" 1,220 m	8. 18º52'32.7" 97º0017.2" 1,221 m
Naolinco	1. 19º38'47.9" 96º51'13.5" 1,469 m	2. 19º38'59.0" 96º51'37.0" 1,528 m
La Perla	1. 18º 57'35.7" 97º8'18.1" 1,890 m	2. 18º57'35.7" 97º08'17.9" 1,875 m
	3. 18º 57'36.5" 97º 08'17.2" 1,876 m	
Rafael Delgado	1. 18º47'55.6" 97º04'11.0" 1,255 m	
Río Blanco	1. 18º50'52.6" 97º 09'45.3" 1,421 m	2. 18º50'52.7" 97º9'47.9" 1,443 m
	3. 18º 50'51.9" 97º 09'49.7" 1,445 m	
Tenanpa	1. 19º13'21.8" 96º52'18.0" 858 m	2. 19º13'23.8" 96º52'16.9" 863 m
Teocelo	1. 19º24'6.4' 96º59'45.9' 1,178 m	2. 19º24'6.8" 96º58'42.6" 1,129 m
	3. 19º24'9.9" 96º59'13.1" 1,073 m	
Tlaquilpa	1. 18º36'10.3' 97º70'14.2" 2,273 m	2. 18º36'11.3" 97º70'15.15" 2,250 m
Tomatlan	1. 19º01"11.9" 96º59'8.8" 1,355 m	2. 19º00"55'96º 58'52.3" 1,351 m
	3. 19º00'54' 96º58'52.2" 1,355 m	
Xico	1. 19º24"6.3" 96º59'44.9' 1,181 m	2. 19º24'6.4' 96º59'45.9' 1,178 m

INTRODUCTION

In Mexico, *Vitis vinifera* L. cultivation was started by the Spanish who colonized this area in the XVth century. Before that time, the natives mainly used fruit from wild *Vitis* species to produce raisins (Comisión national de fruticultura, 1973).

It is common to find wild grapevines in Mexico as it is one of the natural areas of the *Vitis* species. So, for instance, *Vitis arizonica* is originated from Mexico and United States (Riaz *et al.*, 2007). In spite of this, very few studies have been carried out to investigate the *Vitis* germplasm in Mexico (Comisión national de fruticultura,

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1973; Galet, 1988; Rzedowski and Calderon de Rzedowski, 2005; Franco-Mora *et al.,* 2008; Comeaux, 1987). These studies mainly regarded the northern and central part of the country and the States of Puebla and Veracruz.

In the State of Veracruz, a new autochthonous species of *Vitis* was found and named *Nesbittiana* (Comeaux, 1987) and the possible presence of *Vitis bourgaena* and *M. rotundifolia* was indicated (Comisión national de fruticultura, 1973). These reports make the Veracruz area potentially interesting for the exploration of *Vitis* germplasm. The wild plants often differ greatly in morphological traits and vines are found both in tropical (in the plain) and temperate conditions (in highlands). This apparent great biodiversity offers interesting possibilities for finding individuals for breeding programs to develop rootstocks or new varieties. Hence it is important to identify and characterize as many wild grapevines as possible and/or to save them from extinction. This last problem often happens when the natural land is put into urban or agricultural uses. There are already examples of the use of wild grapevines in breeding programs such as in Brazil where hybrids between *Vitis vinifera* and *Vitis labrusca* are promising for wine and juice production in the tropics and subtropics (Camargo, 2000).

Throughout time, people have found different uses for wild grapevines which have been handed down from person to person, whereas very little information has been reported in the literature for such uses in Mexico. To collect this, it could be very important to evaluate the products obtained using traditional procedures, in order to assess the possibility of using wild grapevines to obtain products that could have a specific place on the market focusing on natural products obtained with traditional methods.

The aims of the present study were: 1) to localize geographically the wild grapevines occurrence in some counties in the central part of the State of Veracruz in order to plan their conservation; 2) document human uses of the wild grapevines.

THE WILD GRAPEVINES IN THE CENTRAL PART OF THE STATE OF VERACRUZ

The central area of the State of Veracruz covers 18,296.72 km^2 and accounts for the 25.12% of the State. This area has 111 counties. Twenty of them, which represent most of the tropical and temperate climates that characterize the State of Veracruz, were selected for the study (table 1). General indications, about places where wild grapevines have been noted, were obtained from the herbarium of the National Institute of ecology in Xalapa, in Veracruz. These places and nearby areas were explored in 2006. The wild grapevines that were found were precisely localized using a GPS-12 Channel Garmin personal navigator, which gave the exact latitude (N), longitude (W) and altitude (m) for each one. Material to propagate all the genotypes localized by cutting was collected and new vines were obtained for *ex situ* conservation.

Information on local uses of wild grapevines was acquired through interviews with people living in villages close the places where wild grapevines were found.

A total of 63 wild grapevines were localized and propagated (table 1). They were perennial plants that generally grew over trees. All the vines localized were named using the name of the county and a progressive number. They were distributed in very different places, from 20 m to 2,664 m altitude (table 1). Most of the vines were growing in the mesophile mountain forest over trees in disturbed and not disturbed areas. They were also found over trees near sugar cane (*Saccharum officinarum* L.) plantations, from 20 to 700 m altitude, and over trees that shaded coffee plantations (*Coffea Arabica* L.) or even tangled on coffee plants, from 900 to 1,300 m altitude. Wild grapevines were also found in highlands, from 1,500 to 2,600 m where temperate fruit trees, such as apple (*Malus domestica* Borkh.) and peach (*Prunus persica* L., Batsch), are growing. In the localization procedure, importance was given to the morphological traits of the vines, including all those showing particular leaf shapes.

The morphological traits of the vines that were localized were different from one to another. In figure 1, an example of the shape and color (from green to pink) of the leaves of the different wild grapevines is given. The fruit, which is a berry, had a diameter of 5 to 8 mm and contained 1-4 seeds; at maturity, the color of the skin was purple and, generally, the fresh flavor was not sweet. Most vines had abundant trendils on the shoots.

According to this preliminary description and to complementary works, it would be possible in the future to identify more exactly these vines and to determine the species as, for example, *Vitis aestivalis* Michx. (Boyden and Cousins, 2003), *Vitis blancoi* Munson Emed. Comeaux (Comeaux and Lu, 2000), *Vitis tiliifolia* Humb. & Bonpl. (Haeckel, 2008), or if they can be considered as hybrids or descendants of *Vitis vinifera* L. introduced to Mexico centuries ago.

The differences in the morphology and the huge number of wild grapevines that still have to be localized and evaluated, indicate a great biodiversity that should be characterized. This raises the possibilities of finding new hybrids or multi-hybrids among species (Bisson 2003; Comeaux *et al.*, 1987; Di Vecchi-Staraz *et al.*, 2009). This work should be done also considering that in Mexico

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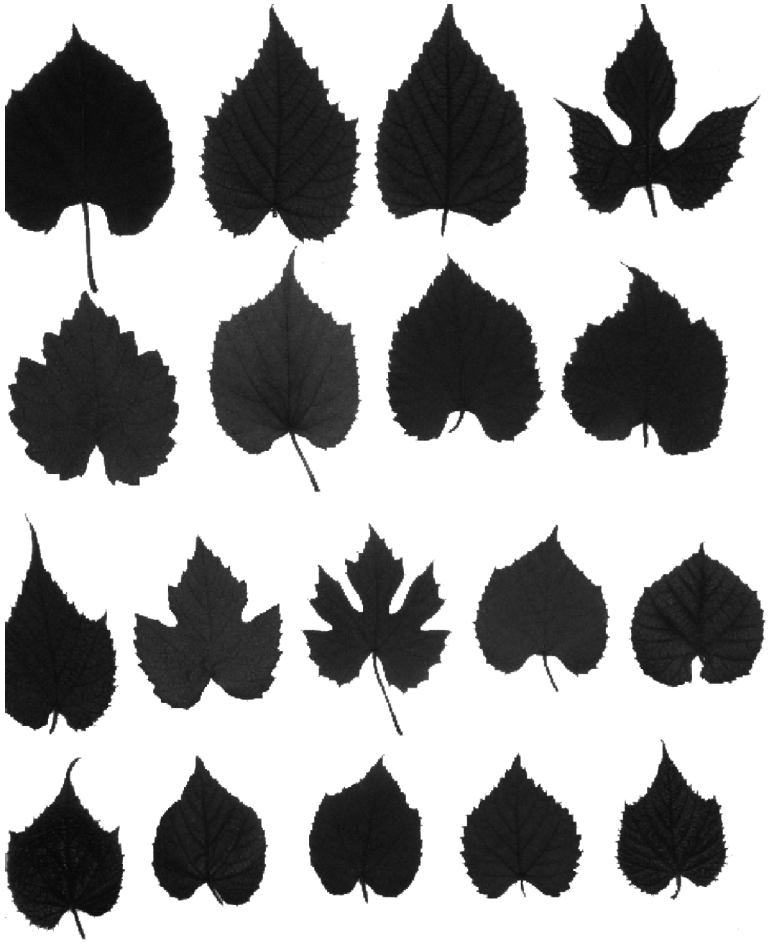

Figure 1 - Example of leaves of some of the wild grapevines (*Vitis* spp) localized in the central part of the State of Veracruz. Each leaf comes from one vine.

the systematists of native *Vitis* require a major revision and the names of the species are tentative (Rzedowski and Calderon de Rzedowski, 2005). The richness in *Vitis* germplasm that should be characterized is also confirmed by the fact that several foreign researchers have included Mexican wild grapevines in their germplasm banks (Comeaux, 1987; Boyden and Cousins, 2003; Riaz *et al.*, 2007).

USES OF THE WILD GRAPEVINES

In the central region of the State of Veracruz, the wild grapevines are named in the Spanish language: *bejuco de parra*, *uva cimarrona* and *bejuco agrio*. In the Mexican Nahuatl language, they are also known as *xocomecatl* that means sour shoots. Inhabitants of the mesophile forest know that to alleviate thirst one can cut a grapevine shoot and drink the water released from it. We documented that in the county of Tlaquilpa wild grapevines are used: 1) to obtain a fruit juice used to reduce the sores on the skin; 2) to produce a alcoholic beverage from the fruit able to improve heart health; 3) to obtain hair shampoo from the leaves. In the county of Cosautlan, a fruit juice from wild grapevines is produced to alleviate heart and kidney diseases and eye irritation. In the county of Naolinco, fruit of *Vitis* spp. are used to make home-made wine, that is bottled and sold by the commercial brand «Pilatos». In the county of Tenampa, the fruit is mixed with maize grains (*Zea mays* L.) and cinnamon (*Cinnamomum verum* J. Presl.) to prepare a dessert named «Manjar».

The investigation has shown several uses for wild grapevines that should be the target of studies to assess the possibility of exploiting wild grapevines to obtain products that could be successfully sold on the market. Hence, wild grapevines could be used to produce, with traditional methods, natural products that are more and more appreciated by consumers.

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