Hunt Institute for Botanical Documentation
5th Floor, Hunt Library
Carnegie Mellon University
4909 Frew Street
Pittsburgh, PA 15213-3890
Contact: Archives
Telephone: 412-268-2434
Email: huntinst@andrew.cmu.edu
Web site: www.huntbotanical.org

About the Institute
The Hunt Institute for Botanical Documentation, a research division of Carnegie Mellon University, specializes in the history of botany and all aspects of plant science and serves the international scientific community through research and documentation. To this end, the Institute acquires and maintains authoritative collections of books, plant images, manuscripts, portraits and data files, and provides publications and other modes of information service. The Institute meets the reference needs of botanists, biologists, historians, conservationists, librarians, bibliographers and the public at large, especially those concerned with any aspect of the North American flora.

Hunt Institute was dedicated in 1961 as the Rachel McMasters Miller Hunt Botanical Library, an international center for bibliographical research and service in the interests of botany and horticulture, as well as a center for the study of all aspects of the history of the plant sciences. By 1971 the Library's activities had so diversified that the name was changed to Hunt Institute for Botanical Documentation. Growth in collections and research projects led to the establishment of four programmatic departments: Archives, Art, Bibliography and the Library.

TROPICAL VINEYARDS
Experimental Grounds
PRINCETON, FLORIDA

J. L. FENNELL
OWNER

COCONUT PALM DRIVE

U. S. Plant Introduction Garden
Coconut Grove, Florida
October 15, 1940

Dear Mr. Popenoe:

Your letter of September 30th was a pleasant surprise, and I shall be delighted to have any further information regarding the Totoloche which you may have the opportunity to obtain.

It is my belief that the new muscadine may have far reaching value for use in muscadine breeding and improvement work, in addition, of course, to its own intrinsic value as an ornamental and fruiting vine. Our plants of the Totoloche are doing nicely and indications are that a small amount of fruit may be borne the coming season. Anyway, here's hoping.

I am enclosing, here-with, two pictures of one of my new hybrid grapes, which, it appeared, might possibly bring to mind some old acquaintance of yours in the plant line. Along in 1935, when I first became interested in grape breeding work, some cuttings were obtained from a vine of Vitis tiliaefolia, that was then growing in a semi wild state in the old Brickell Garden at Miami. Records showed that this plant was P. I. 44060, and that it was collected in Guatemala by yourself back in 1918, or there abouts. This vine is the seed parent of the hybrid pictured.

The hybrid(# 103) is very vigorous and healthy and most productive under our Florida conditions. It seems much more at home even than the mother vine from Central America; and of course there is no comparing it with the sickly, disease ridden and short lived pollen parent or vinifera kinds. The fruit pictured was set from its own pollination and no spraying nor other protection was given.

From your letter I gathered that possibly you never received the Vitis popenoei reprint which was mailed to you last spring. If this is so I shall most certainly send you another.

I do hope that you will be able to come by this way the coming winter, as you signify, and I shall be delighted to have the opportunity of talking with you.

Cordially yours,

Joseph L. Fennell

Antigua, Guatemala, 14 Dec 1940

Dear Mr Fennell:

Many thanks for your letter of October 14, which has only yesterday reached me. The photographs are highly interesting. No, I did not get the separate from the Journal Wash, Acad. Sci. which you sent, and would be glad to have another if you can spare it.

You have an excellent field, in this business of developing good grapes for the tropics. And you seem to be making a lot of headway. I wish I could be of assistance to you.

Re Vitis tiliaefolia, there are some forms in Cuba which I seem to remember as better than any we have down here. I published a photo in the Journal of Heredity, many years ago, in an article I wrote in collaboration with F S Earle if I remember correctly. I'll try to look it up and enclose a reference to it, since you might have occasion to look it up some day. Professor Earle had at his place in Herradura some of these plants in cultivation and talked about using them in the development of a better tropical grape. But I think that is as far as it got.

There is a curious plant growing near here which I take to be a Vitis and which is new to me. It has fleshy roots and bears a few large sized berries which I have not seen in the ripe stage. I'll try to check up on it further; it might be of interest to you.

I am just getting off a batch of orchids to Tom. I hope to get over his way again next year.

Sincerely yours,

"Plant Breeding in Cuba"
Journal of Heredity, Dec. 1915

TROPICAL VINEYARDS
Experimental Grounds
PRINCETON, FLORIDA
U. S. A.

JOSEPH L. FENNELL
Operator & Owner

COCONUT PALM DRIVE
P. O. Box 102

January 16, 1941.

Dear Mr. Popenoe,

Thanks a lot for your reference to the V. tiliaefolia article in the Journal of Heredity. As a coincidence, I have had a separate of this article on my desk for the last four or five years and have particularly noted your expressed interest regarding the possibilities of tropical grape improvement. I have often wondered why it was that so few of our plant men have appreciated the possibilities in this field.

I am very much interested in the large fruited vine mentioned in your last letter. It is probable that this is a species of Ampelocissus, a close relative of vitis. It seems to me that this genus has possibilities for horticultural improvement. I have one species at present (from Philippines) and hope to try breeding as soon as I can get another species or two. There are one or two in Jamaica and two or three in Mexico and Central America.

Are you familiar with a large fruited purple wild grape which is known in the region of Huatusco, Vera Cruz, Mexico, as "Cullulos"? So far my efforts to learn something definite about this plant, or obtain propagations of it, have been unsuccessful. I believe that south Florida and southern Mexico have more to offer in the way of wild types of value to tropical viticulture than does all the rest of the world combined.

I hope that you are still planning to get over this way in the near future. A separate of the Vitis publication is inclosed.

Sincerely, Joe Fennell

Encl.

Have the reprint "Two New North American Species of Vitis" June. Please advise if you would like it forwarded. J.C.V.

TROPICAL VINEYARDS
Experimental Grounds
PRINCETON, FLORIDA
U. S. A.

JOSEPH L. FENNELL
Operator & Owner

COCONUT PALM DRIVE
P. O. Box 102

October 29, 1941

Dear Doctor Popenoe:

Your letter of Odtober 14 was received Monday and was a pleasant surprise. I shall be very glad to give you any information possible in regard to my grape work and which may be used in any way you see fit. If what I am sending is not just what you have in mind dont hesitate to let me know.

I am sending you a copy of a paper that was presented before the Florida Grape Growers annual convention last July but which was never published, since the association has no "Proceedings". I believe that this paper roughly covers the field up to this time. In addition, I am sending a penciled list of what seem to be the most promising species for hot-humid climate viticulture, all of which I am using in breeding experiments. I am also enclosing a few small photographs and a reprint of my recent article in The Journal of Heredity, the separates of which have but recently been received.

I am becoming quite enthusiastic about the possibilities of the Totoloche. As a plant it is very vigorous and extremely disease resistant, but best of all, it appears to hybridize with comparative ease with the bunch grapes. This, as you no doubt know, has not been the case with the other two muscadines, despite the high hopes of the plant breeders. If the Totoloche proves to be the "missing link" a new and very rich field in grape breeding may be opened up. Certainly the prospects are encouraging at this time.

Best of regards to yourself and Mrs. Popenoe

Joe Fennell

P.S.
The reprint, photographs and typed copy are being mailed under separate cover.

JLF

Antigua, Guatemala, 8 Nov 1941

Mr Joseph L Fennell,
Princeton, Florida.

Dear Joe:

It was most generous of you to send me all that material on grape breeding. I have incorporated a large part of it in a paper I have finished this morning, which is about 4000 words inllength and will probably be called "Grapes for Tropical America". I shall offer this to "Tropical Agriculture" of Trinidad, B.W.I., for publication; and if they use it, will ask them to send you 50 separates. I have tried to give you full credit for the information supplied me and for the splendid work you are doing.

I had hoped to use some illustrations, but the ones I took of commercial Isabella culture in the Cauca valley of Colombia did not turn out well and I do not have many others. I have a fine one of a good looking Tehuantepec Indian girl holding a plate of totoloches, but it is rather more girl that grapes, and I am afraid our conservative British cousins might not like it.

Dr Fairchild has just left after spending three weeks in this country. He took back a lot of plant material with him, which I hope gets out of Hoboken with at least the spark of life left in it.

If I ever go up to Tehuantepec again I'm going to get some more information on the totoloche. I am glad it is proving so interesting to you. Some day I hope you can let me have a few of its hybrids for trial in this part of the world.

Again many thanks, and best regards always,

Sincerely yours

GRAPES FOR

~~GRAPE CULTURE IN~~ TROPICAL AMERICA

Wilson Popenoe

Coincident with colonization of the Atlantic seaboard of North America by the English, grape growing received serious consideration throughout ~~this~~ that region. Vines were brought from France, and French vineyardists to cultivate them. Lack of resistance to cold, insects and disease in the northern ~~regions~~ area; susceptibility to disease and insect injury in the southern, are now generally considered responsible for the failure which marked ~~these~~ early efforts.

To more favorable climates

Toward the year 1800 attention began to center on native American species of Vitis. The cultivation of European or vinifera grapes moved west of the Rockies, where it has since attained great commercial importance; while a new horticultural race of grapes, combining a certain amount of vinifera blood with that of several American species, was developed in the East.

The Spaniards in the American tropics, like the English in the North, gave early thought to the establishment of grape culture in their new dominions. And with even more reason, for amidst the strange surroundings and stranger fruits of the New World, they longed for the familiar products of their native country. In one of his first letters to the King, Cortés asked that no ship be allowed to sail for Mexico without bringing seeds and plants for cultivation on the plateaux of New Spain. Bernal Diaz del Castillo, who accompanied Cortés, wrote that he planted with his own hands the first orange seeds.

There can be no doubt that grapes were ~~thus~~ introduced into many parts of tropical America during the XVI century. At the northern edge of the tropical zone - in Mexico - and at the southern -

in Peru, Chile, and Argentina - they were successful. In strictly tropical regions, even when planted at high elevations where the climate is sometimes better, because less favorable to disease, results were not so good.

Some of the early chroniclers assert that vines were cultivated successfully, and good wine made from the fruit, in Guatemala, in Nicaragua, in Ecuador and elsewhere; and they attribute the abandonment of a young and promising industry to prohibitions placed by the King. In order to stimulate an interchange of products with the Mother Country, it was forbidden to produce wine and certain other commodities in the American possessions.

To what extent the failure of grape growing in the tropical regions was due to restrictions of this sort, and to what extent it was due to natural causes, is of no particular importance at the moment. We are concerned with future possibilities, and these can best be evaluated by examining the present status of grape-growing in the tropics.

Cultivated Races

It is the writer's opinion that misconceptions have arisen from a failure to take into account the fact that there are many different species of Vitis. And it is precisely this feature which must be given attention if we are to make real progress with grape cultivation in the tropics. It is proposed, therefore, to review briefly the characteristics of the three cultivated groups as recognized today in the United States.

1. European or Vinifera grapes, horticultural varieties of Vitis vinifera. This as the name indicates is an Old World species, and the only one known to horticulture at the time of the Discovery and Colonization of the New World. It is the classic grape of history and still the favorite everywhere it can be grown success-

fully. Most of the grapes cultivated in the American tropics belong to this species. Their varietal identity, however, has in most cases been lost.

Vinifera grapes are the best of all table grapes, and the world's most important wine grapes. For table use they are particularly appreciated in Latin America, where popular taste generally prefers sweet fruits to those which are even mildly acid.

But the behavior of these vines, as seen today in tropical regions, is anything but satisfactory. They suffer from the attacks of disease, and it is rare that the fruit ripens uniformly. There may be occasional exceptions, but it is highly significant that vinifera grapes, after four centuries of experimental cultivation in tropical America, are still a problem.

The occasional exceptions just mentioned give rise to renewed hopes and much effort which, in the writer's opinion, could more profitably be devoted to the development of hybrid varieties better adapted to tropical conditions.

2. American bunch grapes. These are the cultivated grapes of the eastern and central United States, developed from various native species with the infusion of the European grape "through natural or controlled hybridization", to use the words of Elmer Snyder[*], who further says: The species from which the varieties of this group have been derived rank in importance in the following order: Vitis labrusca, V. vinifera, V. aestivalis, V. linsecomii, V. vulpina, V. aestivalis var. bourquiniana, V. champini, V. rupestris, and V. cinerea."

[*] See "Grape Development and Improvement", in Yearbook of the U.S.Department of Agriculture, 1937.

Strangely enough, one variety of this group, Isabella (of which more later) has found its way to the tropics and has proved better adapted to hot humid climates than any vinifera grape; indeed, there can be little doubt that Isabella is more successful in tropical regions than any other horticultural grape which has been widely tested. ~~This fact makes the American Bunch grapes assume great importance in any effort to develop grape culture in the tropics.~~

This group is represented commercially in the United States by many varieties, of which a few of the best-known are Catawba, Concord, Delaware and Niagara.

3. Muscadine grapes. These are horticultural forms of Vitis rotundifolia, native to the southeastern portion of the United States. They are quite distinct from other grapes both in growth and in fruit characteristics. The plants are very robust, but the berries, of which ~~very~~ few are borne in a cluster, have tough skins and somewhat musky flavor. Scuppernong is the best-known variety; others are Eden, James, Mish and Thomas.

The Isabella Grape

With this brief sketch of the botanical background of grape varieties cultivated in America, it is in order to devote further attention to Isabella. Both its origin and its genetic make-up are obscure. A.J.Downing, in his classic "Fruits and Fruit Trees of America", ~~xxxxxxxxxx~~ (revised by Charles Downing, and published in 1860) says:

"This very popular grape, a native of South Carolina, was brought to the north and introduced to the notice of cultivators about the year 1818, by Mrs. Isabella Gibbs, the wife of George

Gibbs Esq., in honour of whom it was named. Its great vigour, hardiness, and productiveness, with the least possible care, have caused it to be most widely disseminated. A vine growing here has borne 12 bushels of grapes in a single year. It is, perhaps, a little more hardy, and ripens earlier than the Catawba, which renders it valuable at the northern part of this state (New York), or the colder portion of New England. No farmer's garden, however small, should be without this and the Catawba.

"Bunches of good size - five to seven inches long, rather loose, shouldered. Berries oval, pretty large. Skin thick, dark purple, covered with a blue bloom. Flesh tender, with some pulp, which nearly dissolves when fully mature; juicy, sweet, and rich, with slight musky aroma.

"This grape is frequently picked as soon as it is well coloured, and long before it is ripe."

Certainly there is nothing in this account to suggest that Isabella would prove adapted to cultivation in the humid tropics. Nor is there in the little which is known regarding its ancestry. L.H.Bailey, discussing the origin of American grapes in his "Standard Cyclopedia of Horticulture" says: "Already a number of popular varieties show such wide departures that they cannot be referred positively to any species. Of these, Delaware and Isabella are examples." Elmer Snyder, in the publication mentioned above, considers the parentage of Isabella to be Vitis labrusca and V. vinifera, an opinion held also by another modern authority, Philip Wagner, who gives the following interesting account of this variety in his book "Wine Grapes" (New York, 1937):

"A blue grape, one of the two varieties which survived Jacques Dufour's Kentucky and Indiana colonies. It makes a poor red wine,

but since it is hardy, resistant and very productive (Dr. Barreto, the Brazilian viticultural expert, observed that its fertility is 'simply disgusting') it is grown by poor peasants in France, Italy, Central Europe and many other parts of the world. It makes a much better wine when pressed and fermented white-wine fashion, and is used a good deal by the sparkling-wine makers of the Finger Lakes region, who insist that its white wine rapidly loses its foxiness and grows paler, instead of darker, with age. In some parts of France, Isabella wine is distilled for a brandy resembling slivovitz, the leading fire-water of Slavic countries. Ripens with Catawba. Generous pruning."

~~The present writer's~~ My attention was first called to the tropical possibilities of Isabella by seeing it figured in Gerrit Wilder's book, "Fruits of the Hawaiian Islands", published at Honolulu in 1911. Mr. Wilder refers the variety to Vitis labrusca and comments as follows:

"This variety of grape was early introduced to these Islands and has become very popular. It is a hardy vine, variable in productiveness, and is practically the only grape grown in any quantity in Hawaii. The leaves are of medium size, often roundish and thick; their upper surface is dark green, the under surface is whitish green. The Isabella is an attractive blue-black grape, bearing in large, well-formed clusters, having a thick bloom. The muskiness of the skin is somewhat objectionable."

A few years later, ~~the writer~~ I saw this variety cultivated in the vicinity of Bello Horizonte, state of Minas Geraes, Brazil. But it was not until ~~he~~ I reached Honduras in 1925, and found it growing lustily and fruiting abundantly at sea level in the humid climate of the north coast of that Republic, that ~~he~~ I was impressed with the

extraordinary climatic adaptations of this grape. Here is a variety originated in the United States, hardy enough to be cultivated in New England, yet withstanding ~~[illegible]~~ the hot humid climate of the tropics!

From sea level ~~it~~ Isabella can be cultivated successfully up to five or six thousand feet, in Central America, but it is not grown extensively in that part of the tropics. In the Cauca valley of Colombia, scarcely more than ~~one~~ three degrees from the Equator, but at an altitude of about 3000 feet, it is grown commercially. According to Jaime Villegas, professor of agronomy at the Escuela Superior de Agricultura Tropical in Cali, there are perhaps 20 hectares now in production, mostly in the form of small vineyards not over one-half hectare in extent. The plants are not grafted, but are grown from cuttings. They are trained upon trellises with horizontal wires at a height of five or six feet above the ground. Two crops are produced each year. It is customary to wait about one month after a crop has been harvested, then prune severely - and this is invariably done when the moon is waning. The ~~next~~ new crop matures in 100 to 120 days ~~following pruning~~ then.

Professor Villegas further says that vines will remain in good production at least 10 to 15 years - 20 to 30 crops. There being no well-marked seasons in the Cauca valley, the vines can be pruned without regard to month, and a crop ripen four months later. Commercial production commences the fourth year after planting, though a few bunches will be produced by most vines from the second year onward. The soils of this region - at least of those areas where grapes have done best - are gravelly clays and gravelly loams running down to gravel. ~~It has been found that grapes will not thrive on heavy red clays.~~ Stable manure and wood ashes are occasionally used as fertilizers.

Mildew does not seriously attack Isabella grapes in the Cauca valley, but in the case of vinifera varieties - of which there are a few small commercial plantings - it is troublesome. Two or three insect pests have been noted, but they have not assumed great importance as yet.

Other American Grapes in the Tropics

The success which has attended the cultivation of Isabella in the Cauca valley and other strictly tropical regions raises the question, What about other varieties of North American origin? Isabella is not a grape of wholly satisfactory dessert quality. Its value lies in the fact that it is fairly good, and at the same time highly resistant to disease and insect attack, vigorous in growth and a most abundant producer. Among the large number of grape varieties now available in the eastern and southern United States, are there others equally vigorous, equally resistant to disease, and of better ~~table~~ dessert quality?

Attempting to answer this question, we introduced into Guatemala, som ten years ago, a representative collection of northern varieties, inäuding some of the Munson hybrids. T.V.Munson (1843-1915) devoted many years to grape breeding at Denison, Texas - a region rich in native species of Vitis, some of them valuable for breeding purposes. Again to quote Elmer Snyder (l c.cit.), "His work was largely instrumental in producing grape varieties of the bunch type suitable for southern conditions, where most of our varieties of northern parentage fail. Of particular interest and special value was his use ofthe native species Vitis linsecomii, the pinewoods grape, in the origination of hybrid varieties. By combining and selecting the vigorous, healthy native species Munson was able to originate

fruiting varieties that are productive, vigorous, and better in fruiting qualities than the parental types. More hybrid grape varieties have been originated and introduced through his efforts than by any other agency in the United States."

To date, none of the Munson hybrids has shown in Guatemala either the vigor or the productiveness characteristic of Isabella. However, our tests have been limited to a few varieties and a few locations. In passing, it should be noted that an extensive collection of these hybrids has recently been obtained for trial in the Republic of Colombia, through the efforts of Dr. Rafael R. Camacho of the Colombian Ministry of National Economy.

Two varieties of the Muscadine group, Scuppernong and Thomas, have been planted in Guatemala with no encouraging results to date, though growth has been fairly satisfactory. It remains to mention one other variety, probably Niagara, which has turned out so well that it has been propagated and disseminated. This variety (of which the label has unfortunately been lost) is not so robust as Isabella, but has shown admirable resistance to mildew. The bunches are of good size, as are the berries, and the quality definitely superior to that of Isabella. Three years ago I sent cuttings of this variety to the Cauca valley in Colombia, where Professor Jaime Villegas reports that two-year-old plants produced a few racemes of excellent fruit. Niagara originated in New York state about 1872; it is believed to be of mixed labrusca and vinifera parentage.

The Future of Grape Culture in the American Tropics.

Four hundred years of unsatisfactory experience with Vitis vinifera in warm humid regions should suffice to convince us that

The future of commercial grape culture in tropical America depends upon the development of varieties better adapted to local conditions than are any of this species. Experience with Isabella, it seems to me, points out the proper line of attack.

Further evidence - and very excellent evidence - is to be found in the recent breeding work of Joseph L. Fennell at Princeton, Florida. Princeton lies some 25 miles south of Miami, in that part of Florida where conditions most closely approach those of the tropics. Northern grapes do not thrive in this region. It was this fact, plus the presence of numerous interesting wild grapes in southern Florida, which suggested to Mr. Fennell the desirability of breeding work. His progress has been set forth recently in a brief paper entitled "Future 'Ideal' Grapes", published in the Journal of Heredity, for June 1941. In addition, he has sent me in manuscript form a paper which he read before the annual convention of the Florida Grape Growers Association at Eustis, July 17, 1941; also some highly interesting notes regarding breeding material summarised below.

"Early in this work", said Mr. Fennell in his talk before the Florida Grape Growers, "I became convinced that if viticulture was to succeed in south Florida and in the hot humid parts of the world, it must be based upon tropical or subtropical native stock. Thereupon an effort was commenced to comb the woods and swamps of southern Florida and the American tropics for the best wild grapes. Charts were made on which were indicated the natural ranges of the more valuable species. Where certain of these promising forms overlapped, a search was made to find natural hybrids.

"The striking conclusion ultimately reached was this: That

of all the vast tropical and subtropical humid regions of the earth the best grape resources ~~were~~ are right here in Florida, supplemented for good measure by those of southern Mexico and the West Indies. The wild grapes which, in my opinion, have the most value as a basis for hot-humid climate viticulture are the better forms and hybrids of the redshank grape (Vitis rufotomentosa); the south Florida fox grape (V. shuttleworthii); the Florida blue grape (V. gigas); the 'uva cimarrona' of tropical America (V. tiliaefolia or V. caribaea); and the 'totoloche' of southern Mexico, V. popenoei. The best forms of the south Florida muscadine (V. munsoniana) and the figleaf grape (V. smalliana) are also of considerable merit. Most of these have individual and often serious faults in themselves, but within the group are nearly all of the characters needed to build a fine race of warm-climate vineyard grapes."

"Since the beginning of this work I have made an effort to incorporate in my hybrids as much European or vinifera blood as seemed feasible under Florida conditions. Much attention has been devoted to the determination of those vinifera varieties ~~(and they are legion)~~ which combine in the best all-around manner with the wild or native parent. Of the European varieties tested some fifteen have been used in breeding experiments with wild tropical and subtropical selections. ~~A small number of the resulting hybrids have borne their first fruit. Perhaps three hundred or more seedlings should show fruit this coming season.~~"

"From results of the work up to this point the one noteworthy indication is this: It is vinifera, even more than the American sorts, which holds the key to ~~the~~ Florida viticulture of the future."

Breeding Material

Mr. Fennell's remarks lead to the same conclusion which was reached in early days by grape growers of the north, namely, that we need vinifera blood for good table or dessert quality in our grapes, but we need native American species for disease resistance. It is the application of this principle which has given us the only good tropical grape we have today: Isabella.

The technique of grape breeding has been admirably described by Elmer Snyder in the Yearbook mentioned above, as also the present status of breeding work in the United States and several other countries. Nothing is said, however, regarding the production of superior varieties for the tropics. So far as I have been able to learn, Mr. Fennell is at present the only one working on this problem. Below are notes which I have expanded somewhat, from a table he has kindly sent me. This was entitled: "Known Vitis species of greatest promise for the development of hot-humid climate viticulture."

Before setting forth these notes, I would like to quote one paragraph from Mr. Fennell's recent paper in the Journal of Heredity, cited above:

"Since we have ample proof that high quality is easily obtainable in European x American grape hybrids through a careful selection of parents, our one important problem is to produce this superior fruit on disease-free vines. Before this is done we must know what are the more important weaknesses and maladies and how they can best be overcome. The most destructive pests toward which our so-called 'Ideal" grapes must show a high resistance are as fllows: Root louse (Phylloxera

vastatrix); Downy mildew (Plasmopara viticola); Black Rot (Guignardia bidwellii); Anthracnose (Sphaceloma ampelinum); Ripe Rot (Glomerella cingulata); and several leaf spot fungi.

Species

Vitis shuttleworthii, the Florida fox grape. Mr Fennell points out that the berries of this species are harshly acid, but sometimes larger than those of nearly all other wild grapes. For breeding purposes, he considers it useful because of its vigor and productivity, as well as size of berry, thinness of skin, juiciness, and small size of seeds. Its undesirable characteristics are susceptibility to downy mildew, small size of cluster, toughness of pulp, and pungent acidity.

V. rufotomentosa, the redshank grape of Florida. Valuable for its resistance to disease, vigorous growth, large fruit cluster, sweetness and flavor of pulp. Against it are the too compact nature of the fruit cluster, and the small, rather seedy berries.

V. popenoei, the totoloche of southern Mexico. This is a Muscadine grape described as a new species by Mr Fennell in 1940 (cf. Two new North American species of Vitis, in Journ. Washn. Acad. Sci., Vol. 30, No. 1, January 15 1940). In describing it, the comment was made: "In addition to its botanical differences, V. popenoei occupies a distinct climate and a range several hundred miles farther south than that occupied by either of the other two known species of Muscadinia. It is the first and only muscadine grape yet known to occur naturally within the tropics."

The native home of this species is in the Isthmus of Tehuantepec, where fruits from wild plants are collected and sold in the local markets. Mr Fennell considers it of unusual value for bredding purposes due to its vigor and disease resistance as demonstrated in his Florida vineyard; its muscadine relationship and the facility with which it can be hybridised with species of the Euvitis or bunch-grape group; and its large berries of relatively good dessert quality. Its only unfavorable characteristic is its susceptibility to cold, which is, of course, unimportant when the production of grapes for tropical climates is being considered.

V. tiliaefolia (syn. V. caribaea). The Caribbean grape, "uva cimarrona" and "uva silvestre" of Spanish-speaking countries. Widely distributed throughout tropical America. This disease-resistant, vigorous wild species was called to the attention of plant-breeders as early as 1915 by Earle and Popenoe (cf. Plant Breeding in Cuba, in Journal of Heredity, Vol.VI, No. 12, Washington, 1915) who recommended its use in the development of good table grapes for the tropics. Mr. Fennell, who is, so far as I know, the first to attempt such a thing, has illustrated in his recent paper published in the Journal of Heredity, one of his productions which he has called the Fairchild grape. He says of it: "This novel hybrid shows the improvement possible through using the more healthy small-fruited American species. It is an F_1 hybrid of the Central American 'uva cimarrona' and the European variety Alphonse Lavallee. Though neither sprayed nor dusted it has been vigorous and healthy in a region where grape pests are usually devastating. It is the first improved grape on record to be derived from a tropical wild species."

In the tabulation of breeding material sent to me, Mr Fennell lists as the good qualities of this species its vigor and disease resistance; while the small size and acidity of the berry are against it. Having seen this plant thriving in tropical America under many widely different conditions of climate and soil, it is my own opinion that it is likely to prove extremely valuable in the development of better tropical grapes.

V. gigas, the Florida blue grape, described by Mr Fennell as a new species in the Journal of the Washington Adacemy of Sciences cited above. This is considerable valuable for its vigor and productivity; its large compound cluster; and the good quality of its medium-sized fruit. It is slightly subject to downy mildew.

V. munsoniana, the bird grape of South Florida, which L.H. Bailey describes (cf. "Hortus", 1930) as "a muscadine grape, differing from V. rotundifolia in being a more slender grower, continuously flowering or fruiting, the leaves less pointed, the fruit smaller with thinner skin and tender pulp and lacking the strong flavor." In speaking of it, Mr. Fennell says: "One selection of V. munsoniana which was found in the woods of southern Florida produces berries as large as those of Carman or Ives. Theypulp is of a meaty though not tough texture, very similar to that of most vinifera grapes. This is the only truly American grape known to me which has this characteristics." It is considerable value for breeding purposes because of its muscadine relationship, and its vigorous growth, and its medium-sized berry of good quality. Its objectionable characteristics are the small size of the fuit cluster and the difficulty with which it can be hybridized with species of the group Euvitis (bunch grapes).

V. shuttleworthii (syn. V. simpsonii), the figleaf grape of south Florida. Considered valuable for its disease resistance; and its medium-sized clusters of pleasantly-flavored berries. Against it are the thick skin of the latter, and the large seeds. In the Standard Cyclopedia of Horticulture, L.H.Bailey says of this plant: "Some forms of it are very like V. labrusca, and might be mistaken for that species. Its botanical position is yet to be determined."

In Conclusion

I cannot do better than reproduce a recent note from Mr Fennell who is working, it should be remembered, in a region which to all intents and purposes - so far as plants are concerned - is a corner of the West Indies. He writes:"

"A few of my F_1 crosses between the wild Florida kinds and Munson's Extra (Florida Beacon) have the Florida Beacon or Concord Flavor fully 95%. The fruit of the hybrid is, I believe, superior to either Beacon or Concord, since the flavor is somewhat sweeter and the pulp about the seeds not nearly so tough. The berries of this cross average about 3/8 inch in diameter. The vine's productivity is not yet fully demonstrated.

"No vinifera variety yet tried in Florida has been successful and few varieties survive the first summer, yet several F_1 hybrids of certain vinifera sorts with wild Florida selections seem to be perfectly at home. None of the northern American cultivated sorts shows any promise whatsoever in southern Florida. I have imported Isabella from Hawaii and I have tested nearly all of the better-known northern labrusca varieties and hybrids. None does well here."