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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.

OSU

Agricultural Experiment Station

OREGON STATE UNIVERSITY

SOUTHERN OREGON EXPERIMENT STATION
569 Hanley Road
MEDFORD, OREGON 97501

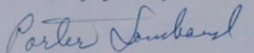
January 27, 1969

Dr. Wilson Popenoe
Director Emeritus
Escuela Agricola Panamericana
Antigua, Guatemala, C. A.

Dear Dr. Popenoe:

We do not have good *P. betulaefolia* seed to send you until next fall. I hope this will help you at that time. I will try to remember, when that time arrives, to send you some. However, another letter from you in October 1969, will help me remember.

Sincerely yours,



Porter B. Lombard
Assoc. Prof. of Horticulture

PBL/as



Antigua, Guatemala, 27 October 1969

Dr Porter B. Lombard
Oregon State University
Medford, Oregon.

Dear Doctor Lombard:

Referring to your letter of 27 January last, if you now have seed of Pyrus betulaefolia and could spare us a little for experimental planting we would be very grateful. Since I assume the quantity will be small and wont weigh much, if you could send it by air mail, addressed to me at Antigua, Guatemala (no street address necessary) I feel sure it would come through promptly.

From the seed of Pyrus calleryana we got from Herbst Bros of New York last spring we have some 15,000 fine young seedlings in nursery which will be grafted next spring. Experience to date, and information from the Pacific Coast of the U.S. makes us feel that this rootstock is our best bet. Three years ago we planted a lot of seed of "French pear" from Herbst Bros. I assume this was Bartlett or something similar. We have had these seedlings in nursery at 5900 feet - not cold enough for Bartlett or other communis pears. They were grafted two years ago, with Clapp Favorite and Lincoln (supposedly). Yesterday I went over the nursery. Fifty percent of the plants are completely rotten at the roots; the grafts on all of them grew well the first season but have not grown at all since. Typical of communis pears at too low an elevation - not enough cold. Communis pears here need at least 6500 feet - and this of course is a matter of variety and the "microclimate" perhaps. Bartlett has not done well here

below 8000 feet; Clapp Favorite is good at 6500 or 7000. I don't know what to think of communis as a rootstock; it has never been used here, pears have been put on Crataegus mexicana until we started three years ago to try communis. But we do have experience with the Oriental hybrids from Florida, Hood, Baldwin, and Kieffer for example on calleryana; trees over at our school in Honduras at 6000 feet are now 16 years old and doing beautifully.

We are going ahead with this pear business, but it will take time. This year we have a good crop on Bartlett's trees from California, 8 years old. The first crop, really. Not many, but it seems to me just as good fruits as I have seen in California. They are at 8000 feet. I am told - or have heard - that Bartlett has the highest chilling requirement of the commercial pears. I have a hunch that Bartlett on calleryana at 8000 feet may give us an industry here; canned pears which they call "Del Monte" here - they think that is a variety! For fresh fruit and perhaps canning, Clapp Favorite looks mighty good. But we are getting some new hybrids from the southeastern U.S. which also look good. Ralph Sharpe of Florida is giving us a lot of help.

Faithfully yours,

OSU

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569 Hanley Road
MEDFORD, OREGON 97501

November 26, 1969

Dr. Wilson Popenoe
Escuela Agricola Panamericana
Antigua, Guatemala

Dear Wilson:

I am sending you P. betulaeifolia seed from our Talent source in a separate envelope. We just were able to harvest the fruit and remove the seed from the fruit. The seed source is about as pure as possible because of the isolation of these trees. The trees are furnishing the bulk of the Betulaefolia seed in the country. For germination the seeds should be chilled (stratified) for 52 days (90% germination) to 86 days (for complete germination) at 40°F.

Enclosed is a copy of an article on pear rootstocks which may be of help. You will note that P. Betulaefolia produces the most vigorous pear trees which can give us trouble for blight infection on the top variety because of the rank growth.

I hope this will give you a good start on P. Betulaefolia but if not, we can send more. You will note that we have favored P. Calleryana also.

Sincerely yours,

Porter B. Lombard

Porter B. Lombard
Assoc. Prof. of Horticulture

PEL/as
Encs.



Pear rootstocks for the northwest
as related to pear decline and general performance

M. N. Westwood, Department of Horticulture
Oregon State University

Of all the factors which influence fruit yields, none is more important than the choice of rootstock. Rootstocks are not merely passive structures which support the trees and supply them with water but are vital organs influenced by diseases, insects, soil types and climate, and which affect tree size, nutrient uptake, cropping efficiency and fruit quality. The recent epidemic of Pear Decline dramatically displayed the influence of rootstock type. Decline was found to be a virus-induced rootstock disorder in which phloem necrosis (bark injury) occurred below the bud unions of susceptible stocks, causing root starvation and ultimate collapse or slow decline of the top. It was found (4) that pear psylla insects transmit the decline virus into the trees while feeding on the leaves. Seedling rootstocks cannot easily be labelled simply resistant or susceptible, because they display all possible gradations between complete tolerance and death. In terms of vigor, many trees are intermediate as a result of decline. Any tree 5 or 6 years old and still alive is on a root at least partly resistant to the decline virus. Such trees may respond somewhat to better culture and pest control but will never regain their pre-decline vigor and performance. They are doomed to a lifetime of mediocrity. A recent study (7) in Oregon showed that slow decline in 7-year Bartletts on Bartlett seedling root reduced yield to 0.2 boxes per tree compared to 1.16 boxes from healthy trees.

A survey of decline in more than 15,000 trees is summarized in Table 1. Both P. serotina and P. ussuriensis showed a high proportion of decline, but several others had moderate numbers of weak trees, too. The only seedling type with no decline at all was P. betulaeifolia. Seedlings of Old Home x Farmingdale, P. calleryana, and Nelis also were quite resistant. A report by Blodgett et al. (1) that P. calleryana is susceptible to decline is not supported by work in Oregon (6) and California (3).

Table 1. Effect of rootstock on incidence of pear decline (stage 1 = healthy, stage 5 = nearly dead).

Rootstock type	Decline stage:			
	1	2	3	4&5
<u>P. communis</u>	percent			
Imported French	39	24	16	22
Bartlett seedling (Medford)	21	46	23	10
" " (Wenatchee)	19	53	25	3
Nelis seedling	37	35	17	11
Kirschensaller seedling	44	33	22	0
Old Home x Farmingdale	50	32	14	4
<u>P. caucasica</u> seedling	17	21	28	35
<u>P. calleryana</u> "	49	39	7	4
<u>P. betulaeifolia</u> "	95	5	0	0
<u>P. ussuriensis</u> "	12	36	13	38
<u>P. serotina</u> "	15	13	17	55

A number of clonal rootstocks have been selected which are immune to decline. They are propagated by rooting dormant cuttings. Trees on decline-resistant stocks are not necessarily healthy under all conditions because they may be adversely affected by soil conditions, climate and disease organisms. For example EM Quince A is resistant to decline (as is Provence Quince) but is hurt by wet soils (Table 2).

Table 2. Effect of soil drainage on health of pear trees on EM Quince A rootstock.

Drainage condition	Tree Condition:		
	Healthy	Moderate percent	Sick or Dead
Well drained	91	9	0
Poorly drained	69	12	19
Very wet, non-drained	0	2	98

P. ussuriensis and P. serotina also are sensitive to wet soils, P. communis and P. betulaefolia are quite resistant, while P. calleryana is outstandingly tolerant to waterlogged soils. This may result from its resistance to Phytophthora water molds (2). Most all quince, P. calleryana and P. betulaefolia are susceptible to chlorosis when grown in soils high in calcium. P. betulaefolia appears to be more drought-resistant than other stocks tested.

Certain clonal roots are sensitive to specific soil types. Self-rooted Bartlett and OH-50 do well in sandy soils but are weak in clay soils. On the other hand, self-rooted Anjou, Old Home x Farmingdale, and Old Home do well in all types of soil.

Climatic effects:

All types of P. communis stocks are hardy to the pear districts of the Northwest. P. betulaefolia and some types of quince are moderately hardy, while P. calleryana, P. pashia, P. koehnei, P. amygdaliformis and some quince are tender. Observations of winter injury made in 1963 by the late Dr. Robert Lindner indicated that at Prosser 18% of exposed tissues of P. calleryana (below the bud union) were injured, while none of the P. communis showed winter damage.

Resistance of stocks to some diseases and insects is listed below:

<u>Fire blight</u>	<u>Crown Gall</u>	<u>Root Aphid</u>
<u>Resistant:</u>		
<u>P. calleryana</u>	<u>P. calleryana</u> (some)	<u>P. calleryana</u>
<u>P. Fauriei</u>	<u>P. betulaefolia</u> "	<u>P. betulaefolia</u>
<u>P. betulaefolia</u> (Reimer's) Quince		<u>P. ussuriensis</u>
<u>P. ussuriensis</u>	Old Home x Farm. (some)	<u>P. amygdaliformis</u>
Old Home x Farmingdale		<u>P. elaeagrifolia</u>
Old Home		
<u>Susceptible:</u>		
Most <u>P. communis</u>	<u>P. communis</u> (most)	<u>P. communis</u>
" Quince		<u>P. Fauriei</u>
<u>P. pashia</u>		<u>P. cordata</u>
<u>P. amygdaliformis</u>		
<u>P. elaeagrifolia</u>		

Growth Control:

Historically quince has been the only dwarfing pear stock used. Uncertain compatibilities and other problems led us to explore other possible dwarfing stocks. We are testing a large number of P. communis (domestic, imported and special crosses) and a number of other species and genera as growth-controlling rootstocks. Several stocks may be useful in this regard. Sorbus aucuparia (Mountain Ash), Crataegus oxyacantha (English Hawthorn), P. Fauriei, P. syriaca, and some special clones of Old Home x Farmingdale are dwarfing. P. amygdaliformis, P. elaeagnifolia, and P. pashia are semi-dwarfing. None of these stocks have been tested long enough to suggest general use.

One problem with quince is that our main variety Bartlett is incompatible and must be double-worked with a compatibility bridge. Our studies show that Old Home is better than Hardy for that purpose (5). Also, we find that the double-bud technique (in which a thin plate of Old Home is sandwiched between the Bartlett bud and the quince cambium) is quite as good as a long piece of Old Home. Recently 2 mutant strains of Bartlett have been tested which are compatible directly on EM Quince A and Provence Quince. They are referred to as French compatible (P.I. 241968) and Swiss compatible Williams (P.I. 267940). Use of these strains make it easier for nurserymen to propagate on quince, but also permits the grower to keep the trees dwarf (i.e. prevent scion rooting). Old Home interstems root readily and cause the trees to be vigorous rather than dwarf, while Bartlett does not readily scion root. Anjou and Comice also can be worked directly to quince, but Bosc, Seckel, Packham's Triumph, and Eldorado need an Old Home interstem.

Proper spacing is essential if full advantage is to be taken of dwarfs. Tests in Oregon indicate that trees on EM Quince A should be planted 3 to 5 feet apart in the row, with rows 10 to 12 feet apart. This gives a minimum tree density of 725 trees/acre and a maximum of about 1450. Provence Quince is a bit more vigorous than Quince A and thus should be planted a little further apart. Vigorous varieties should be given more room than weak-growing ones. Dwarf hedgerows should be trained to an upright central leader system and should be supported on a 1- or 2-wire trellis by the second year. Under optimum conditions, commercial yields of Bartletts can be gotten the third year. Anjou, Comice and Bosc should start by the fifth year. Quince rootstocks may not be hardy enough for some areas of the Northwest.

Yield efficiency:

It was previously pointed out (9) that rootstocks affect the yield potential of the scion variety. Both old and young plantings in Oregon (7,9) have shown that P. calleryana is the most efficient stock of the vigorous group. In a 25-year test with Bartlett, Anjou and Comice, trees on P. calleryana root produced 32% more fruit than those on P. communis (Imported French) even though the trees were the same size. P. betulaeifolia tends to be a bit less efficient for some varieties than P. communis, but with Seckel it is very good. Yield of Anjou on P. betulaeifolia is usually light, resulting in drought spot (internal corking of the flesh). Several clones of Old Home x Farmingdale have been selected which thus far have shown better yield efficiency than unselected domestic seedlings. They are being propagated by one of Oregon's nurserymen. A large number of Pyrus species and types are being tested at Oregon State University for cropping efficiency. Hopefully some of them can be introduced in a few years.

Fruit Quality:

Fruit quality tests during 8 years in Oregon have shown that some differences in acids and pressure can be attributed to rootstock type. In general, quality and storage behavior has been good on P. communis (includes domestic seedlings, imported French, Old Home, and Old Home x Farmingdale), P. calleryana, and quince. P. betulaeifolia has induced good quality to most varieties except Anjou and should not be used for that variety.

Effects of viruses:

Cooperative tests made with Dr. John Milbrath at OSU have shown that the severe strain of vein yellows virus can permanently impair the cropping potential of our common varieties. We checked growth and yield in trees from 13 sources of Bartlett (8). The 2 which did not contain the virus bore 12 tons per acre during the first 6 years, compared to 6 tons per acre for the virus-infected ones. More recent tests have shown that virus-infected Anjou, Comice and Hardy trees grow slower and have less bloom than virus-free checks. With such striking differences in performance, it is important that both growers and nurserymen get and maintain virus-free varieties. Stony pit virus is also important and should not be permitted in Bosc, Anjou and other varieties in which the fruit is pitted and deformed by the virus. As yet we do not have Bosc, Seckel, Packham's, and Eldorado free of vein yellows, but at least they are free of stony pit virus.

Oregon Pear Rootstock (OPR) introductions:

In 1967 OSU introduced 12 clonal rootstocks to interested nurserymen (6). Each is resistant to decline and has been outstanding in bearing fruit. They are grouped as follows:

1. Imported French (P. communis) - rootsprouts from outstanding orchard trees (4 clones).
2. Old Home x Farmingdale (P. communis) - rootsprouts from outstanding station trees (4 clones).
3. P. calleryana - rootsprouts from outstanding trees at Medford (4 clones).

Nursery trees from some of these stocks will be available in 2 years.

Tree spacing:

Planting distances will depend upon variety, rootstock and soil type. As mentioned before, fully dwarf trees should be at least 725 trees per acre (12' x 5'). More vigorous stocks will need more room but still can be planted in filler systems of 400 to 500 trees per acre. A good spacing for Bartletts on vigorous stock is a 12' x 8' rectangle. This is held for 8 or 9 years, then alternate 8' trees are hedged back for a year or two and then removed, leaving a new rectangle of 12' x 16'. Another removal may eventually be required, leaving a final spacing of 24' x 16'. The rectangular filler plan is more efficient and easier to use than is the square thinned to a quincunx.

Replacing of old unproductive orchards should not be done by interplanting but by a planned removal of a given number of rows of old trees each year. The cleared land is then planted at better spacings appropriate to new rootstocks and smaller orchard equipment.

Rootstock suggestions for new plantings:

The following rootstocks and their characteristics are listed as a guide to growers and nurserymen.

1. Old Home x Farmingdale - vigorous, hardy, productive, resistant to blight and decline. Clones are propagated by hardwood cuttings.
2. P. calleryana - vigorous, productive, resistant to blight, root aphid, leaf spot, crown gall, susceptible to lime chlorosis, moderately resistant to decline. Trees are not hardy and unions should be below ground. Use in Hood River and Washington on a trial basis only. Propagated by seeds or root pieces.
3. Old Home (self-rooted) - vigorous, hardy, moderately productive, resistant to blight and decline, young trees susceptible to pseudomonas canker. Propagated by hardwood cuttings.
4. Bartlett (self-rooted) - semi-vigorous, hardy, productive, resistant to decline, susceptible to blight, does not tolerate clay or tight soils. Propagated by leafy or hardwood cuttings.
5. P. betulaefolia (Oregon selections) - very vigorous, moderately hardy, moderately productive, resistant to blight, decline, root aphid, crown gall, susceptible to lime chlorosis. Do not use this stock for Anjou variety. Propagated by seed, root pieces or hardwood cuttings.
6. Domestic seedlings (Bartlett, Anjou, Nelis) - vigorous, hardy, moderately productive (on trees with no decline), moderately resistant to decline, susceptible to blight, root aphid. Propagated by seeds.
7. Imported French - vigorous, hardy, moderately productive on trees with no decline, only partly resistant to decline, susceptible to blight, root aphid. Propagated by seeds.
8. Quince (EM Quince A and Provence, Series C) - dwarf, not hardy, productive, resistant to decline, root aphid, crown gall, susceptible to blight, not compatible with some varieties, sensitive to lime chlorosis and wet soils. Propagated by layers and hardwood cuttings.

Of the vigorous stocks listed our evidence favors Old Home x Farmingdale, self-rooted Old Home, and P. calleryana, the latter to be limited to areas with mild winters. These stocks are more uniformly resistant to blight and decline than unselected domestic or imported P. communis. Domestic seedlings are preferred to imported French, which show somewhat more pear decline.

Literature Cited

1. Blodgett, E. C., Henry Schneider and M. D. Aichele. 1962. Behavior of pear decline disease on different stock-scion combinations. *Phytopath.* 52(7): 679-684.
2. Cameron, H. R. 1962. Susceptibility of pear roots to *Phytophthora*. *Phytopath.* 52(12): 1295-1297.
3. Griggs, W. H., D. D. Jensen and Ben T. Iwakiri. 1968. Development of young pear trees with different rootstocks in relation to psylla infestation, pear decline and leaf curl. *Hilgardia* 39(7):153-204.
4. Jensen, D. D., W. H. Griggs, C. Q. Gonzales and H. Schneider. 1964. Pear decline virus transmission by pear psylla. *Phytopath.* 54: 1346-1351.
5. Westwood, M. N. 1966. The principle of limiting factors in fruit growing. *Proc. West. Colo. Hort. Soc.* 23: 21-35.
6. Westwood, M. N. 1967. Clonal pear rootstocks introduced. *Oregon Orn. and Nurs. Dig.* 11(1): 3.
7. Westwood, M. N. and P. B. Lombard. 1966. Pear rootstocks. *Proc. Ore. Hort. Soc.* pp. 61-68.
8. Westwood, M. N., J. A. Milbrath and P. B. Lombard. 1967. Oregon's OP-9 Bartlett pear. *Amer. Pom. Soc. Frt. Var. Dig.* 21(1):18-19.
9. Westwood, M. N., F. C. Reimer and V. L. Quackenbush. 1963. Long term yield as related to ultimate tree size of three pear varieties grown on rootstocks of five Pyrus species. *Proc. Amer. Soc. Hort. Sci.* 82: 103-108.

Antigua, 18 December 1969

MEMORANDUM FOR DON ARTURO FALLA

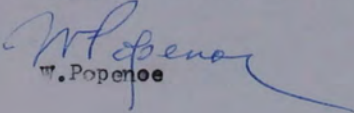
Pyrus betulaefolia.

In a letter dated November 26 1969, from Dr Porter B. Lombard of Southern Oregon Experiment Station, Medford, Oregon, regarding seeds of this pear rootstock which I am giving you today, he says:

For germination the seeds should be chilled (stratified) for 52 days (90% germination) to 86 days (for complete germination) at 40 degrees Fahrenheit.

Prof. Lombard also says: P. betulaefolia appears to be more drought resistant than other stocks tested. --- P. calleryana is the most efficient stock of the vigorous group so far as production is concerned. In a 25 year test with Bartlett, Anjou and Comice trees on P. calleryana produced 32% more fruit than those on P. communis (imported French) rootstocks. P. betulaefolia has induced good quality to most varieties except Anjou.

He further writes: P. batulaefolia (Oregon selections) very vigorous, moderately hardy, moderately productive, resistant to decline, root aphid, crown gall, blight, susceptible to lime chlorosis. P. calleryana vigorous, productive, resistant to blight, root aphid, leaf spot, crown gall, moderately resistant to decline.


W. Popenoe

Antigua, Guatemala, 5 January 1970

Professor Porter B. Lombard
Southern Oregon Experiment Station
Medford, Oregon 97501.

Dear Porter:

Please pardon my tardiness in thanking you for the *Pyrus betulifolia* seed sent with your letter of 26 November. I have been over in Honduras.

I turned over the seed to Arturo Falla, who is doing more with pears here in Guatemala than anybody else, and who has in his nursery at this time about 10,000 young plants of *P. calleryana*. He is just about the only man here who has facilities for refrigerating seeds and has been getting fine results with other material. He is delighted to have this species for trial, and I am too.

I thank you also for the leaflet on pear rootstocks. This is very helpful. I believe I have written you that we feel very hopeful regarding calleryana, due to its good behavior here and in Honduras. On the other hand, we are having a lot of trouble with communis pears grafted on Bartlett rootstocks three years ago. These trees, a couple of thousand of them in a government nursery at Aposentos, 15 miles from here and at an elevation of slightly less than 6000 feet, are giving us much trouble. Now, here is the point I would like to bring to your attention: We are finding that Bartlett has the highest chilling requirement of all the pears we have tested here. At Quezaltenango, nearly 8000 feet, it is doing well. It has not done well at 6500 feet, which is the lowest elevation at which we are growing some communis

varieties (we think we have Clapp Favorite and Lincoln) on *Crataegus pubescens*, which is the rootstock for pears which has been practically the only one used here up to now.

In the government nursery at 6000 feet, Bartlett rootstocks grow well the first year and the trees grafted on them did well the first year. Then they stopped. For the past two seasons they have made practically no growth at all, and on digging a lot of them we find about half the roots, Bartlett, are decayed and dying or dead.

We are having the same trouble with apple rootstocks at 6000 feet, which is too low for apples. I am therefore wondering if we are making a mistake in trying to grow nursery stock at lower elevations than apples and communis pears can be grown successfully. I don't suppose you have had to face this problem in Oregon.

We have had a few Hood pears on Bartlett rootstocks develop well up to now. On the other hand, a hundred or more Hoods on Bartlett which were moved from the nursery to 7000 feet - high enough for Hood but not for Bartlett, died out completely. The Hoods which are growing well are at 6000 feet - high enough for Hood and other Oriental hybrids such as Kieffer and Pineapple.

Trees at 6000 feet on calleryana - and I refer to Baldwin and Orient and Pineapple - have done well. For this reason we are sticking to calleryana as our best bet (for not many pears are planted here at the Bartlett altitude, 8000 feet) though most nurserymen are going to continue with *Crataegus pubescens* in part. One problem with this rootstock is that they have great trouble grafting it in nursery. The practice is to plant *Crataegus* seedlings in orchard form. When the trunks are about two inches in diameter, they cleft graft or crown graft them in situ, and results are satisfactory. There are many communis pears here at 6500 to 7500 feet on *Crataegus* which

the rootstock tremendously; I have seen plenty of trees where the Crataegus rootstock is only six inches in diameter below the graft, and the common pear trunk above the graft is at least two inches thicker. The main objection to Crataegus is its very slow growth. On the other hand, it is drought resistant and will grow on poor soils.

Just as a matter of interest, we are not getting anywhere with Mallin Merton rootstocks, except 109 which is doing fairly well. All apple trees grow slowly in the cool climate of our apple-growing regions. Mallin Mertons produce at an early age but so far are just simply not making trees big enough to be of much use. H.B. Tukey has warned us that Mallin Mertons near the very best culture. This is almost impossible to get here. The feeling is now that we should stick to "criollo" (so called native) rootstocks and attempt to control woolly aphis, which is a terrible pest with us, by chemical means. This year I do not believe any Mallin Merton rootstocks are being planted.

The two apples we are recommending right now at Winter Banana and Wealthy, though Gravenstein and one or two others look hopeful if given enough altitude. As to pears, those who have calleryana seedlings are going to graft mainly to what we think are Clapp Favorite, Lincoln and Clairgeau. I am not at all sure that we are right about Clairgeau, but the variety we are calling this has been doing well for many years at Cantel, about 7800 feet, and the fruits bring 25 cents a pound in the market.

We greatly appreciate your cooperation and want to keep in touch with you regarding our pear problems.

Faithfully yours,