Phytophthora ramorum Technical Working Group responses to first set of questions

1) A 2007 article by Dart and Chastagner (attached) has brought up questions regarding the spread of *Phytophthora ramorum* **through soil** via non-host nursery species and related materials. Please share your thoughts and scientific opinions concerning this potential pathway and the level of associated risk. If there are risks via this pathway, please include suggested mitigations (in as much detail as you desire) including the areas of inspection, sampling, testing, certification which would reduce or eliminate the risk. Does the information presented in the paper support any suggested mitigations?

No.	Comments	Suggestions/Recommendations
1.	Pots directly on soil or weed mat with lots of organic matter and some soil on it, in an area which had previously tested positive for P. ramorum. Potential pathway for spreading P. ramorum on non-host nursery stock.	Risk in this situation (positive P. ramorum site) would be high. It is possible to move inoculum on contaminated pots, it is unclear what conditions would be necessary for this inoculum to actually cause disease on plants. If the pots had been on raised beds covered with gravel or weed mat which had no soil or organic matter, the risk would be very low, even with P. ramorum positive soil below the surface. Visual inspection of pots for adhering soil. Effectiveness of any approach would probably be dependent on prohibiting the movement of all plant material from areas where Pr infected plants are detected until all soil baiting is completed.
2.		Growing the crop with a barrier between the soil and bottom of the pot. More work needs to be done on non-host plants transporting enough to inoculum to cause an infection in a high risk plant or in the native environment.
3.	Movement of infective agents from substrate soil into pots and from pots into substrate soil is not uncommon. Movement is random and has no connection with host or non-host.	The direct contact between potted plants and soil can be mitigated by the exterior cleanliness of the pots and barring direct contact between the pots and substrate soil. A mat can lose its effectiveness as it wears or if it is not cleaned or sanitized as plants are moved on and off of it. A more efficient barrier might be a metal or plastic grate on top of a mat, that lessens the direct contact as long as the soil is not allowed to build up between pots and grates.
4.	Pathogen pathways, significant enough to change the basic tenet of phytosanitary inspection – that a plant that is apparently free of pests is qualified for a phytosanitary certificate. The consequences of staying with this tenet in the light of exotic Phytophthora spp. are far too high. Little confidence in sanitation of soils, weed mats, gravel, maybe even pots with available and environmentally acceptable chemical agents.	Better detection methods for hitchhikers, endophytes, contaminants. Soil baiting seems to be the best tool. Any place with a history of P. ramorum over several years, and grows known host plants should submit to regular (quarterly?) soil baiting tests. This assumes that the "pathogen" will decrease in the absence of a host on which it causes obvious disease symptoms; that may be invalid. If P. ramorum hangs around indefinitely as a symbiont, endophyte or rhizosphere member, these mitigation measures may not be enough. Commit to regulating the pathogen/microbe in all it natural states, not just diseased plant material. Where soil detections have been made and after the CNP has been followed, plants should be grown on an inert surface, a raised platform or bench that is out of range of soil-borne inoculum, until soil detections are negative for a period of time. Steam from portable generator-applicators and electrical resistance heating of soils are possible mitigations that are worth exploring.

No.	Comments	Suggestions/Recommendations
5.	Nursery containers of symptomless and nonhost plants may nevertheless serve as sources of inoculum. Roots of nonhosts can, at least temporarily, harbor P. ramorum temporarily. Soil of symptomless host plants can harbor Phytophthoras.	Soil should be sampled if a nursery is suspected of being infested with P. ramorum. It might be more efficient to sample runoff water rather than soil, and since water samples can be pooled, the runoff from a large number of plants might be able to be evaluated at one time.
6.	Elimination of P. ramorum from an infested nursery can be rarely achieved. Propagules of P. ramorum can escape from a container into nursery and nearby settings. Irrigation run-off and rain play a major role in long distance movement of the propagules.	Little is known for the level of inoculum required for new infection by propagules in soil and water, it is critical to maintain the low level of inoculum throughout a nursery to minimize the spread of the disease. During an inspection, potting mix (host plant and non-host plant, especially for those in same block), nursery ground soil (starting from the site where infected/host plants were being held), and irrigation run-off should be assayed. More effective treatment strategies need to be developed and tested to keep the population of P. ramorum in check.
7.	Symptomatic aerial infections on known host species in nurseries might reflect only the tip of the iceberg of the real situation. Most of the inoculum produced on infected leaves eventually ends up in the soil, and only a small non-qualified fraction of the inoculum successfully infects other hosts. The quantity of inoculum in the whole systems (nursery) at any stage depends on the transmission rate and the survival of the inoculum in the soil. There are few studies on zoospore survival in soil and on root infection; diplanetism has been observed in the lab, which might indicate that zoospores could survive in wet soils and water for long periods. There is circumstantial evidence that infection on asymptomatic roots as well as on asymptomatic leaves could be more frequent than supposed before either in the wild and in nurseries. Another question is whether these potential hosts can sustain P. ramorum sporulation to a level enough for allowing the pathogen transmission within and between hosts over time. The extent of the spread of P. ramorum within nursery might be directly proportional to the span of time from the first introduction of P. ramorum in the nursery.	

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8.	New Zealand prohibits the intentional import of soil and goes to considerable efforts to ensure unintentional imports, such as soil on shoes or shipping containers, is removed before entering New Zealand.	Debate around how much risk there is from unintentionally imported soil, as much of it would never find its way to an environment suitable for the organisms within to establish. Soil carried with nursery stock represents a significantly higher phytosanitary risk and measures should be in place to ensure soil from P. ramorum areas is not exposed to host plants. Potential measures could range from: Verifying the soil is mostly free of P. ramorum (using PCR testing or soil baiting, depending on time and money); Ensuring plants intended for shipping out of P. ramorum areas are grown in non-soil media (assuming non-soil media will not support populations of P. ramorum); Ensure all non-host nursery stock being shipped out of P. ramorum areas must, on arrival at their destination, have the soil removed and the roots washed before re-potting. Waste soil and water should be treated or disposed of appropriately.
9.	Where recirculation is practiced (e.g., in the Netherlands) even true non-hosts are viewed as high risk in infested nurseries shipping plants in containers. For nurseries that don't recirculate irrigation water, or for those that purify it first, the residual risk comes from runoff and splashing from hosts to non-host containers and soil.	Purification of irrigation water should be required of any infested nursery using a recirculating system. All stock on site before the installation of purification would remain highly suspect. If infested hosts' soil tests are positive, sampling should include soil from non-host root balls, and the sides of pots, as well as soil beneath them. Where roots are washed and plants are shipped bareroot, this risk is greatly lessened for true non-hosts. But washing systems also damage fine roots, and may provide opportunities for root infection that aren't usually tested. Would not require any additional mitigations for non-hosts shipped bare root until risk is demonstrated.
10.	P. ramorum has maintained a fairly significant soil and water phase. Inverse relationship between survival of the pathogen and organic content of the soil.	Testing soil in nurseries on a random basis may be extremely important: either by randomly selecting a certain number of pots per nursery quadrant, or more economically by testing the water run off for each quadrant. Baiting is probably the most effective approach. Mitigation: increase organic component of nursery soil may be an easy way to mitigate the problem, add compost.

No.	Comments	Suggestions/Recommendations
11.	P. ramorum can move with symptomatic and asymptomatic plants in pots with infested soil media. The soil can be infested with the pathogen in various forms, but probably chlamydospores alone or in infected leaf tissue would be most important in its long term survival and therefore risk of movement. Roots may also be infected and they may produce sporangia and zoospores under conducive conditions.	Important to characterize "risk" beyond that of "spread of P. ramorum". In this case, risk should be defined in terms of the potential for movement and successful infection of a new host in a new area. Relative risk: Plants: high Roots: moderate Soil: low The effectiveness of fungicides on root infections is unknown. Fungicides probably do not eradicate infections but that is something that has not been tested.
12.	Survival in soil, movement in water. Inoculum in soil or potting media, surviving and moving with debris or in water.	Methods to eradicate from containers and media and soil through steam or vapam to reduce the risk.
13.	Risk of dispersal through movement of soil may be great, however the likelihood of this inoculum actually causing successful infection of plants at the new site is tremendously reduced.	
14.	Three critical control points for managing Phythophthora species (Parke et al., 2008) in nursery settings. Contamination of potting soil with native soil, irrigation water, and used potting containers. Pre-shipment inspections have not been adequate to ensure shipped plants are free from Phytophthora, nor has this method informed growers about sources of contamination in their nurseries.	P. ramorum positive nurseries adopt a systems approach to mitigating the risk associated with shipment of their plants.
15.	Non-host nursery species and related materials present a lower risk for the dissemination of P. ramorum than do comparable materials from hosts, but not zero. Current mitigation measures on nursery host material are clearly only partially effective in preventing spread, principally because of the limitations of current surveillance programs.	Detection programs cannot identify all infected individuals, which logically results in a persistently leaky pathway. Current surveillance programs are a long way from ideal, so there seems little practical benefit to considering additional mitigation measures for non-host materials.
16.		In the UK, the risk is mitigated by requiring destruction of the pots containing an infected plant and disinfection of a 2 m radius around a positive find.
17.	Compost/soil associated with non-host plants, potential pathway which was recognized in the recent drafting of the EU PRA for P. ramorum, although a lower risk pathway than compost/soil associated with known host nursery species. Level of risk influenced by nursery practice, and recirculated irrigation water (that has not been treated in some way) will increase that risk.	Measures in place in EU legislation to reduce the risk (shaking off compost whilst leaving the minimum amount to 'sustain vitality' during transport).

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18.	Several researches (Parke et al. and Sishkoff) have shown that P. ramorum has a soil phase on host species that can lead to foliar infestations. That sporangia and chlamydospores could be introduced to potting mix of non-hosts could happen in a nursery as demonstrated by Dart and Chastagner. Potential for dispersal of P. ramorum in wholesale nurseries would be a good project for the new P. ramorum nursery test facility in California.	Wholesale nurserymen are advised to include non-hosts blocks of P. ramorum nursery stock in alternation with host blocks to minimize loss should P. ramorum be detected in a host block. In confirmed nurseries, non-host potting mix within the 10 m distance of a P. ramorum block of hosts should be randomly sampled and baited for P. ramorum. Sample size would be determined by level of confidence of detection and available resources.
19.	Any plant or object placed on infested soil has the potential to move the pathogen.	Best management practices of keeping all plants and objects elevated off the soil has worked well in the UK and should be examined because of how easily P. ramorum can be transferred through contact with soil.

2) Currently, plants related to *Phytophthora ramorum* are classified two ways: hosts and associated plant species (HAP). Hosts are proven using Koch's Postulates and are regulated in their entirety, living plant stock (nursery and forest) and all associated plant parts (e.g. logs, branches, etc.). Associated species are regulated as nursery stock and no associated plant parts are currently regulated. Is there science that warrants drawing a line between the two or should they all be classified as hosts? Why or why not? Are there potential risks associated with maintaining one list as opposed to keeping two lists?

No.	Comments	Suggestions/Recommendations
1.	Associated species have been demonstrated to be associated with P. ramorum. Experimental hosts, some are highly susceptible. Some cultivars of species are susceptible. Inspection is very difficult.	Three lists, including the experimental host list.
2.	Artificially inoculated plants in the laboratory and have exhibited observable symptoms. Test plants may be hosts, but inoculated heavily under ideal conducive conditions. Young plants are utilized in testing and not large mature trees. There is logic in placing such plants on a different list from those that have been found infected naturally and which have had Koch's postulates performed. Temporary "holding bin" for plants until someone performs further tests.	Mock nursery in California, associated plants could be placed outdoors next to infected hosts to see if natural infections occur, and Koch's postulates performed. Support for testing of associated plants to determine if they qualify as hosts, and "associated plants" be recognized as a temporary designation.
3.	How many "associate" host plants have been found naturally infected in a wild/urban setting versus in a nursery setting? Laboratory research suggests that under artificial conditions, P. ramorum can infect several plant species that don't become infected when exposed in the wild. Koch's postulates have been completed for at least two plants on the "associate" host list (salmonberry and poison oak), although this hasn't been officially recognized.	If the majority of "associated" hosts have been found infected in nurseries (i.e., under artificial cultural conditions that are often conducive to disease), it makes sense for the lists to remain separate. If the majority have been found in the wild, the lists should be combined. It might be helpful to review the literature to see if any others on the associated list need to be moved to the host list.

No.	Comments	Suggestions/Recommendations
4.	Having separate regulations for proven and associated hosts of P. ramorum probably increases the risk that this pathogen will be moved on some associated plant parts. Currently there is a lack of interest in completing and publishing Koch's postulates on associated hosts.	
5.	Why regulate the host's associated plant parts in some arbitrary way? Common sense approach needs to be taken, especially when it adversely impacts a grower or industry.	Common sense approach needs to be taken, especially when it adversely impacts a grower or industry.
6.	The two-list system risks not regulating plant parts that could provide inoculum to uninfected areas. The one-list system risks over-regulating plants that were "incidentally" infested, and aren't true hosts.	Size of the affected market needs to be known before deciding if the costs in lost sales are justified for the additional (unknown) quantity of protection that would be afforded by a single list. Decision making based on a value judgment via a cost-benefit analysis assigning hypothetical probabilities to the risk posed by the status quo, related to the volume of trade in plant parts.
7.	Assuming 'associated species' have been found on or associated with P. ramorum in a way that suggests they are hosts, then the distinction between 'hosts' and 'associated species' seems to reflect uncertainty more than differences in host-pathogen interactions.	If the prescribed measures for all 'host' species are considered appropriate, then if these 'associated species' are just host species that have yet to have a Koch's postulates completed, a precautionary approach would have the same measures being applied.
8.	Many associated plants move to the host list after further testing. These plants were hosts all along, and should have been treated accordingly. Maybe it would be better to be more cautious and treat them all the same (as hosts) until definitively proven otherwise. Once an associated plant moves to a host status, the damage done by lack of regulation may be difficult to reverse. Treating one group less stringently on the regulatory side may lead growers to be less careful in their nursery practices with these plants than they are with host plants.	
9.	All should be classified as hosts. Koch's postulates are often performed on detached leaves, logs, or small sapling plants. In many ways, the methods used for fulfilling Koch's postulates, may look for symptoms on hosts that are already compromised to some extent.	Would not make satisfying Koch's Postulates the only criteria for acknowledging a particular species as a host It is also worth considering the size of potentially affected markets before making a judgment on the inclusion of a host plant on the basis of one record.
10.	A two tier system is ok	Some associated plant species may be treated as hosts if: Isolations were made at least twice from plants in two different sites. PCR positives may not be that significant as the host may be a dead-end, and single isolations may not be that significant as they may represent an exceptional case. If an associated plant species gave two isolations from two distinct sites (more than 5 km apart, based on known biology of pathogen), that associated plant should be treated as a host.

No.	Comments	Suggestions/Recommendations
11.	A difference exists in certainty between Koch's postulates hosts and non-Koch's postulates hosts which could provide a scientific rationale for a difference in regulatory measures. From a practical standpoint, not a very useful distinction given that risk of movement of the pathogen on the pathway is not necessarily contingent on the host-pathogen relationship, but rather on movement of sufficient inoculum.	Under one list, the list would have to be examined to confirm that changes in regulatory measures are consistent with the real risk.
12.	The two lists should remain separate because a number of plants on the associated host list are one-time incidents, or they were associated with a high risk plant, e.g., non-hosts being left in a humid, cramped overwintering house with infected high risk plants and several months later these non-hosts were found to exhibit symptoms of Pram infection.	
13.	The two lists are helpful in some regards, misleading in others. Associated hosts could serve as a pathway for unwitting dispersal.	With Phytophthora pathogens, proven and associated hosts are just one means of dispersal that deserve regulatory attention, non-hosts and inanimate materials should be given greater consideration as well.
14.	The weakest link in Koch's postulates is that we just can not reconstruct the same condition when the infection occurs in nature. The failure to infect a plant may be due to missing environmental factors. A large scale outbreak could happen via a plant species which was not included on the list.	Still valuable to keep the current system – host and associated plant mainly due to cost-benefit perspective.
15.	If associated species is defined more loosely, there could be potentially hundreds more species listed. The situation becomes more difficult if specific plant parts to be regulated are considered.	
16.	In inoculation trials it is very common to find more than 70% of plants tested becoming infected to different degrees, so potentially seven plants out of ten produced in a nursery can be infected. Whether these potential hosts can sustain P. ramorum sporulation to a level to allowing pathogen transmission within and between hosts over time is unknown. Koch's postulates is a guarantee of the susceptibility of the host to the pathogen but does not say anything about transmission potential.	On the basis of current research there is probably more risk of P. ramorum long distance dispersal and effective transmission for fruits of some HAP and regulated hosts (e.g. Viburnum tinus) than for logs of regulated hosts (e.g. Quercus agrifolia).
17.	In the UK, measures are required against susceptible plants, which are all plants that have been confirmed as hosts. Inspectors inspect all hosts which have been infected in laboratory tests, which has resulted in several confirmed findings.	

No.	Comments	Suggestions/Recommendations
18.		The current system should probably stay in place because there is strong science for proof of pathogenicity (Koch's postulates) and lumping associated plant species would imply the same science standard when if fact it had not been demonstrated. This should not change how surveys are done.
19.	Historically, adding a host species using Koch's postulate required verification by field studies. Many of the hosts of P. ramorum were verified only under artificial conditions.	Adding additional hosts for P. ramorum should require testing using Koch's postulates in field conditions and validation by peer review. This is so we can differentiate between hosts that have been scientifically confirmed and hosts that have come into contact with the pathogen but don't necessarily support its reproduction.

3) The U.S. Code of Federal Regulations definition (301.92 -1) of nursery stock states that the below plants are not regulated, and yet they may be exposed to contaminated media or water, spores in the air, splashed P. *ramorum* from the ground, or be growing in infested soil (field grown).

From the regulation - Any of the below in a nursery (host nursery or non-host nursery) is not regulated:
Seeds, turf or sod; bulbs, tubers, corms, rhizomes (of other than listed species); greenhouse grown orchids, cactus, succulents; aquarium grown aquatics; palms; cycads; tissue culture plants grown in vitro

What this means: These items are not subject to regulation (other than the regulations for soil) and do not require inspection and do not require certification for movement.

No.	Comments	Suggestions/Recommendations
1.	Tissue culture plants are not likely to carry P. ramorum because pathogens are very apparent as a contaminant on both rooting and multiplication media. Contaminated culture vessels would be discarded. There is always a risk with the other items becoming contaminated with P. ramorum propagules and moved to other areas.	It is not feasible to monitor or regulate these items except when associated with known hosts, associate or experimental hosts. A nursery that has host plants plus many other non-host plants would be very difficult to monitor by inspection. Resources would limit the extent of the inspection process.
2.		Items are always at least a minimum distance away from any SOD infected plants in their respective nurseries.
3.	The greatest risk with those articles which were once in soil within a quarantine area, e.g., bulbs, tubers, rhizomes, etc. As for the remaining materials, there is no reason to make the regulations any more onerous that they already are without data to back it up.	Require the articles be washed free of all visible soil prior to export. Allow state/county regulators to survey the fields' soil for P. ramorum prior to harvest. If no P. ramorum is found in the fields, the articles can be shipped.
4.	If bulbs, tubers, or rhizomes of non-hosts are sold in a dry, soil-less condition, there is little risk (unless they turn out, in fact, to be hosts): insignificant. Greenhouse grown non-host plants might have infested soil (from irrigation or infested potting mix) but the risk is low: slight risk. Aquarium plants ought to be tested. Tissue culture plants grown in vitro, presumably watered with sterile water and grown on soil-less media, would not be a risk: insignificant.	

No.	Comments	Suggestions/Recommendations
5.	Potential risk of spreading P. ramorum with the movement of some of these types of plants. Some evidence of asymptomatic infection of roots on some plants. Risk of spreading P. ramorum on greenhouse grown plants and tissue cultured plants that are grown in vitro is very small or non-existent if appropriate steps are taken to ensure growers are utilizing good sanitation and the plants are grown in clean potting media and being irrigated with pathogen free water. Very unlikely that aquarium grown aquatic plants would be a source of P. ramorum. There are aquatic plants collected from streams. What about non-HAP hosts that are harvested in forests which might become exposed to infected understory plants during harvest?	Some of the types of plants listed may be contaminated with inoculum and/or have asymptomatic colonization of roots, tubers, bulbs, corms, or seeds if they are exposed to inoculum.
6.	It is very easy for non-hosts to be contaminated even if they are potted in clean soil or grown in fields of clean soil, if the 'wild' habitat around some nurseries is close and has foliar hosts that shed spores. Because they are not regulated, growers and regulators (inspectors) of nurseries are less cognizant of these plants and the conditions under which they are growing.	Whether to regulate these items can only be answered by 'in the field' experimentation in a nursery setting. Select an operating nursery and make a deal with the owner and any cooperating customers that you will pay the nursery for plants selected by customers in exchange for the ability to test, inspect and do any pertinent follow-up inspections or tests wherever those plants move to and for an extended period of time (whatever the parameters of the experiment require).
7.	Not the same for turf, bulbs, tubers, corms, rhizomes, and greenhouse grown orchids (there are orchids grown in tropical environments and in cooler environments) where P. ramorum has been found in nurseries.	Full exemption makes sense for cactus, succulents, palms, cycads and tissue culture plants grown in-vitro because environmental conditions in these nurseries might not be conducive to infection and dispersal, so the risk is very low compared with other pathways. Fruits, especially in California, might become a serious problem in the future in quarantine areas; the susceptibility of strawberries and oranges to P. ramorum should be investigated. No clearly identified risk for dry seeds.
8.	Very low risk	
9.		Any plant part contaminated by soil should be considered a risk if sourced from infested areas/nurseries.
10.	Soil is the concern.	If hosts and non hosts are grown together, soil from both should be tested, again run-off may be an easier way to go and include both, by sectioning nurseries in sectors and testing run off from each sector.
11.	Full exemption as appropriate for seeds, aquarium-grown plants and in vitro plant material. For the rest of the materials, some risk is surely present.	Soil associated with these non-hosts should be bait-tested just like other plants in the quarantine areas or especially where P. ramorum has been detected in that establishment.

No.	Comments	Suggestions/Recommendations
12.	The items in a nursery in the quarantine area would appear to be at very low risk of having potential to spread P. ramorum, given that in the past 10 years these articles have not been demonstrated to have a role in the pest's epidemiology. Therefore it seems reasonable that they be fully exempt from regulation. Despite demonstrable evidence that P. ramorum has been moving around N. America on nursery plants for > 20 years, SOD is not expanding beyond its current range in the US west coast and that it epidemiology is tied to the unique characteristics of that ecosystem: i.e. bay laurel and tanoak "spore pump" species, low high and high low temperatures, and > 20" of moisture.	It may be appropriate, to re-evaluate the existing risk maps with respect to the importance of climatic and host complex suitability.
13.	Presumably inspectors are already examining even non-hosts in infested nurseries for symptoms. It makes sense to do this in non-infested nurseries in the quarantine zone, but probably just visually.	
14.	The items have to be considered in the same way as compost/soil associated with non-host plants as a pathway for spread, but also needs to take account of the fact that non-regulated planting material such as seeds/bulbs/orchids/cacti (concerned about palms) are often produced/processed in a different way and on different premises to plants for planting (hosts and non-hosts), i.e., would pose an even lower level of risk, possibly negligible risk in the case of some of these materials.	
15.	If there were potentially risky (infected) plant parts of non-host plants, the amount of inoculum and subsequent infection rates that we would see in other states would be so much greater, but it is not.	Focus should be placed on mitigation efforts to reduce the spread of the pathogen via 'proven' high risk plants, such as rhododendrons and camellias.
16.	All of these plant materials can be considered as potting mix, nursery ground soil, or run-off water. Survival and pathogenicity of P. ramorum on these materials has not been studied, but it is always possible to spread the pathogen via contaminated materials.	Biological role of these plant materials in P. ramorum epidemics needs to be studied first before making any kind of logical assumption.
17.	May be possible for these items to transmit P. ramorum under certain conditions. Asymptomatic crepe myrtle roots have been shown to harbor P. ramorum, it may be true for other species.	Require more regulation than exists currently if any plant or plant part is shown to harbor the pathogen in some form. Each would need to be tested to assess the risk.

No.	Comments	Suggestions/Recommendations
18.		For 'high risk' sites (where P. ramorum is in the vicinity but absent from the place of production), require additional measures on all plants (not just susceptible plants): (i) Fortnightly official inspections of all plants on the premises. Suspect symptoms to be tested by Lateral Flow Device with laboratory testing of positive results. (ii) Laboratory testing of representative random samples of leaves once every 3 months (iii) Laboratory testing of water bait samples once every 3 months from any water courses/irrigation water within or near the premises (noting that recovery rates may be lower in summer months). Supplementary baiting of soil, gravel beds, paths etc. may also be required. Movement controls (i) Movement of all other plants only to be permitted provided all plant debris has been removed from the surface of growing containers. (ii) Susceptible plants in the production and sale areas must not have received any treatment with anti-Phytophthora fungicides during a 6 week period prior to dispatch. (iii) Cleaning and disinfecting of any tray/pots which are going to be re-used (relevant also to your first question).
19.	The potting mix in which any plant grows is a potential pathway for movement of P. ramourm in a confirmed nursery situation. If P. ramorum is in the irrigation water or in soil under pots, any plant with potting mix has the potential to move P. ramorum or any other Phytophthora.	
20.	Most of these plants are not produced in an area that would be exposed to sporangia or chlamydospores. If they were, they are no more susceptible to carrying the spores than anything else (shovels, clothing, boots, etc.).	These plants should not be regulated for P. ramorum just because they have the potential to spread P. ramorum via contact.