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Importation of Moth Orchids (*Phalaenopsis* spp.) in Approved Growing Media From Taiwan

**Final Environmental
Assessment,
December 2003**

Importation of Moth Orchids (*Phalaenopsis* spp.) in Approved Growing Media From Taiwan

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I. Purpose and Need for Proposed Action

The United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Plant Protection and Quarantine (PPQ) is proposing to amend the regulations for the importation of plants and plant products (7 Code of Federal Regulations (CFR) part 319) to add orchids of the genus *Phalaenopsis*, known as moth orchids, from Taiwan, to the list of plants that may be imported in approved growing media, subject to specified growing, inspection, and certification requirements.

Currently, *Phalaenopsis* and other orchids are imported from Taiwan into the United States as bare rooted plants or growing on tree fern slabs or in coconut husk or fiber. In 1997, Taiwan requested that PPQ consider amending the regulations to allow *Phalaenopsis* spp. orchids to be imported into the United States in approved growing media under the provisions of 7 CFR § 319.37–8(e).

Background

Currently in the United States, moth orchids are grown in pots primarily for the interior design market. It is not uncommon for the plants to be mass-produced and sold at wholesale to general merchandise retailers and specialty outlets where they are purchased by consumers. *Phalaenopsis* spp. and other orchids are imported into the United States as bare rooted plants, or growing on tree fern or in coconut husk or fiber (7 CFR § 319.37–8(d)) and are enterable subject to inspection findings at USDA plant inspection stations at certain U.S. ports of entry. Many U.S. potted orchid growers start out with imported plants; they purchase the bare rooted imports, grow them, then pot them for sale. (In Hawaii, for example, it has been estimated that growers import about half the orchid plants they use to establish potted orchids.) In the United States all orchid plants sold to general merchandise and specialty outlets are potted, and all are sold by U.S. growers (K. Dolan, pers. comm.).

According to USDA, Foreign Agricultural Service trade statistics, Taiwan's orchid exports to the United States were valued at \$9.4 million in 2001 (K. Dolan, pers. comm.). Taiwan is the largest exporter of *Phalaenopsis* spp. orchids to the United States. Taiwan has requested to export to the United States moth orchids potted in sphagnum moss or other approved growing media. This will improve the viability of imported plants because currently there is high mortality of bare rooted plants (Su *et al.*, 2001). In addition, with this rule change, Taiwan can provide potted, finished plants directly to U.S. retailers (K. Dolan, pers. comm.).

In this document, PPQ analyzes the environmental effects of implementation of the proposed rule changes to 7 CFR part 319. This environmental assessment (EA) was prepared to comply with the National Environmental Policy Act of 1969 (NEPA) 42 United States Code (U.S.C.) 4321, *et seq.* as prescribed in implementing regulations adopted by the Council on Environmental Quality (40 CFR §§1500–1508), by USDA (7 CFR part 1b), and by APHIS (7 CFR part 372), and to satisfy Executive Order (EO) 12114, “Environmental Effects Abroad of Major Federal Actions.”

II. Alternatives, Including the Proposed Action

This EA analyzes potential environmental consequences of the implementation of a proposal to amend the regulations governing importation of plants and plant products into the United States (7 CFR part 319). Two possible alternatives are considered in this EA: regulation under the proposed rule (preferred alternative) and maintaining the current regulation for the importation of orchids of the genus *Phalaenopsis* into the United States (no action alternative).

A. No Action

The no action alternative would be to leave 7 CFR part 319 unchanged. Section 319.37–8(a) of the regulations requires, with certain exceptions, that plants offered for importation into the United States be free of sand, soil, earth, and other growing media. This requirement is intended to help prevent the introduction of plant pests that might be present in unapproved growing media; the exceptions to the requirement take into account factors that mitigate that risk. Those exceptions, which are found in paragraphs (b) through (e) of 7 CFR § 319.37–8, consider either the origin of the plants and growing media, the nature of the growing media, and/or the use of a combination of growing conditions, approved media, inspections, and other requirements.

Currently, *Phalaenopsis* and other orchids are imported as bare rooted plants established solely on tree fern slabs, coconut husks, or coconut fiber (7 CFR § 319.37–8(d)). All forms are enterable subject to inspection findings at designated ports of entry to the United States, i.e., ports associated with facilities where propagative material can be examined (plant inspection stations). All orchid consignments must be accompanied by a USDA permit and a phytosanitary certificate issued by the plant protection service of the

exporting country. This document certifies that the orchids have been inspected and found free of quarantine pests.

The following taxa established in approved growing media are currently allowed entry to the United States: *Alstroemeria*, *Ananas*, *Anthurium*, *Begonia*, *Gloxinia* (=*Sinningia*), *Nidularium*, *Peperomia*, Polypodiophyta (=Filicales), Rhododendron from Europe, and *Saintpaulia* (7 CFR § 319.37–8(e)). Under the no action alternative, *Phalaenopsis* spp. orchids from Taiwan would not be added to the list of taxa allowed entry into the United States established in approved growing media, but would continue to enter the United States under current requirements (7 CFR § 319.37–8(d)).

B. Amend Regulations According to the Proposed Rule

This alternative would change 7 CFR part 319, according to the proposed rule, and allow importation of moth orchids of the genus *Phalaenopsis* from Taiwan rooted in approved growing media, provided the orchids are produced, handled, and imported in accordance with the requirements of 7 CFR § 319.37–8(e) and are accompanied at the time of importation by a phytosanitary certificate issued by Taiwan's Bureau of Animal and Plant Health Inspection and Quarantine (BAPHIQ) declaring that those requirements have been met.

The proposed action of propagation, rearing, shipping, and importation of *Phalaenopsis* in approved growing media into the United States from Taiwan must meet the following requirements in 7 CFR § 319.37–8(e):

(e) *Phalaenopsis* spp. orchids may be imported from Taiwan established in an approved growing medium if the article meets the conditions of this paragraph and is accompanied by a phytosanitary certificate issued by BAPHIQ that declares that the article meets the conditions of this paragraph:

(1) Approved growing media includes baked expanded clay pellets, organic and inorganic fibers, peat, sphagnum moss, vermiculite, and other media (see 7 CFR § 319.37–8(e)(1) for a complete list), and must not have been previously used.

(2) Articles imported under this paragraph must be grown in compliance with a written agreement for enforcement of this section signed by BAPHIQ and PPQ, must be developed from mother stock that was inspected and found free from evidence of disease and pests by a PPQ or BAPHIQ inspector no more than 60 days prior to the time the article is established in the greenhouse (except for articles developed from seeds germinated in the greenhouse), and must be:

- (i) Grown in compliance with a written agreement between the grower and BAPHIQ, in which the grower agrees to comply with the provisions of this section and to allow inspectors and representatives of BAPHIQ access to the growing facility as necessary to monitor compliance with the provisions of this section;
- (ii) Grown solely in a greenhouse in which sanitary procedures adequate to exclude plant pests and diseases are always employed, including cleaning and disinfection of floors, benches, and tools, and the application of measures to protect against any injurious plant diseases, injurious insect pests, and other plant pests. The greenhouse must be free from sand and soil and must have screening with openings of not more than 0.6 mm on all vents and openings except entryways. All entryways must be equipped with automatic closing doors;
- (iii) Rooted and grown in an active state of foliar growth for at least 4 consecutive months immediately prior to importation into the United States, in a greenhouse unit that is used solely for articles grown in compliance with this paragraph;
- (iv) Grown from seeds germinated in the greenhouse unit; or descended from a mother plant that was grown for at least 9 months in Taiwan prior to importation of the descendent plants into the United States, provided that if the mother plant was imported into Taiwan from another country, it must be:
 - A. Grown for at least 12 months in Taiwan prior to importation of the descendent plants into the United States, or
 - B. Treated at the time of importation into Taiwan with a treatment prescribed for pests of that plant by BAPHIQ and then grown for at least 9 months in Taiwan prior to importation of the descendent plants into the United States;
- (v) Watered only with rainwater that has been boiled or pasteurized, with clean well water, or with potable (municipal) water;
- (vi) Rooted and grown in approved growing media listed in 7 CFR § 319.37–8(e)(1) on benches supported by legs and raised at least 46 cm above the floor;
- (vii) Stored and packaged only in areas free of sand, soil, earth, and plant pests;
- (viii) Inspected in the greenhouse and found free from evidence of plant pests and diseases by a PPQ inspector or an inspector of BAPHIQ, no more than 30 days prior to the date of export to the United States.

The packaging commonly used in the orchid industry is cardboard boxes, but other alternatives, such as plastic, are possible. These cardboard boxes are similar to other PPQ-approved packaging that excludes pests during the packing process and prevents hitchhikers from entering the packaged plants. The term “hitchhikers” is commonly used within PPQ to mean biological

contaminants, including insects, that generally are not specific to orchids. PPQ-approved packing material includes paper, rock wool, sawdust, and other media specified in 7 CFR § 319.37–9. The pots containing the plants are most likely those that are commonly used in the orchid industry such as plastic, clay, or other composite materials.

Preshipment treatment measures (i.e., fumigation) are not included as a condition of entry of *Phalaenopsis* spp. orchids from Taiwan because the pest risk assessment (USDA, APHIS, 2003a) did not identify any quarantine pests which required these treatments in order to ensure quarantine security beyond the mitigations listed in 7 CFR § 319.37–8(e).

III. Affected Environment

The area available for both the current importation of bare rooted *Phalaenopsis* orchids and the proposed importation of *Phalaenopsis* spp. orchids from Taiwan in approved growing media is the United States, including its possessions and trust territories. However, no orchid plants will be shipped directly to a location prior to passing through a PPQ plant inspection station where plants can be inspected at the port of entry. Once consignments are cleared through a plant inspection station, orchids could be distributed to any location in the United States, including its possessions and trust territories.

After receiving Taiwan's request to allow importation of *Phalaenopsis* spp. orchids established in approved growing media into the United States, APHIS conducted a pest risk assessment (USDA, APHIS, 1997) to examine the potential plant pest risk associated with unmitigated importations of moth orchids in growing media. This risk assessment was revised in 2003 (USDA, APHIS, 2003a) to provide new information and to employ current accepted guidelines for risk assessment preparation. The revised risk assessment prepared by APHIS to examine the plant pest risk associated with the importation of moth orchids from Taiwan followed version 5.02 of the PPQ Guidelines (USDA, APHIS, 2000) and characterizes risk in terms such as high, medium, or low, based on supporting evidence. In addition, the methods used to initiate, conduct, and report the risk assessment are consistent with guidelines provided by the North American Plant Protection Organization and the International Plant Protection Convention administered by the Food and Agriculture Organization of the United Nations.

In the revised risk assessment (USDA, APHIS, 2003a), only the quarantine pests that can reasonably be expected to follow the pathway (i.e., be included in commercial shipments of *Phalaenopsis* plants) were further

analyzed. A quarantine pest is defined as “a pest of potential economic importance to the area endangered thereby and not yet present there, or present but not widely distributed and being officially controlled” (FAO, 2002). The biological hazard of organisms identified only to the order, family, or generic levels (except for *Bradybaena* spp. mollusks) is not assessed, but if pests identified only to higher taxa are intercepted at the port of entry in the future, then reevaluations of their risk may occur. Although thrips are known to be pests of *Phalaenopsis* spp. orchids in Taiwan (Yang, 1997), they were not analyzed further in the risk assessment because there was no linkage of specific thrips species to *Phalaenopsis* in the scientific literature. The pests that were determined to have potential to be included in commercial shipments of *Phalaenopsis* (both bare rooted or in growing media) are listed in table 1. The plant pathogenic fungus *Colletotrichum phalaenopsisidis* Saw. was identified in the 1997 risk assessment as a quarantine pest likely to follow the pathway. However, since the original risk assessment was completed, *Colletotrichum phalaenopsisidis* was synonymized to *Colletotrichum gloeosporioides* (Penz.) Penz. & Sacc. in Penz. (Redlin, 2002). *Colletotrichum gloeosporioides* is widely distributed in the United States (Farr *et al.*, 1989) and, therefore, is no longer of phytosanitary concern.

Table 1. Quarantine pests that may follow the pathway on *Phalaenopsis* spp. from Taiwan into the United States in an unmitigated importation as identified in the risk assessment document (USDA, APHIS, 2003a).

Arthropods	<i>Planococcus minor</i> (Maskell) (Homoptera: Pseudococcidae) <i>Spodoptera litura</i> (F.) (Lepidoptera: Noctuidae)
Mollusks	<i>Acusta (=Bradybaena) tourranensis</i> (Souleyet) and <i>Bradybaena</i> spp. (Mollusca: Bradybaenidae)*
Fungi	<i>Cylindrosporium phalaenopsisidis</i> Saw. (Fungi Imperfecti, Coelomycetes) <i>Phomopsis orchidophila</i> Cash & Watson (Fungi Imperfecti, Coelomycetes) <i>Sphaerulina phalaenopsisidis</i> Saw. (Loculoascomycetes, Dothideales)

* For purposes of this EA, *Acusta (=Bradybaena) tourranensis* and *Bradybaena* spp. will be analyzed together.

Host Range of Quarantine Pests: More than 10 families of plants are listed as hosts for the mollusk *Acusta tourranensis*, including both herbaceous and tree species (Lai, 1984). The host range of the mealybug, *Planococcus minor*, includes more than 100 species in over 60 families (ScaleNet, 2003). The host range for *Spodoptera litura* includes plants in the families Cruciferae, Rutaceae, and Fabaceae (Zhang, 1994). The host range for *Cylindrosporium phalaenopsisidis* and *Sphaerulina phalaenopsisidis* is assumed to be only *Phalaenopsis* (USDA, APHIS, 2003a). The host

range for *Phomopsis orchidophila* includes only species of *Catasetum*, *Cattleya*, *Coelogyne*, *Cymbidium*, and *Phalaenopsis* (Uecker, 1988).

Climate–Host Interaction: The mollusk, *A. tourranensis*, has a tropical distribution (Lai, 1984) that corresponds to no more than three climatic zones (USDA, APHIS, 2003a). The mealybug *P. minor* occurs in regions represented by no more than three subtropical plant hardiness zones in the United States (USDA, APHIS, 2003a). The moth *S. litura* occurs over a wide range of climates and may establish in four or more plant hardiness zones. The geographical distribution of *P. orchidophila* includes Taiwan, South America, Mexico, Guatemala, Puerto Rico, India, Australia, and the Pacific Islands (Uecker, 1988). The climatic ranges for *C. phalaenopsisidis* and *S. phalaenopsisidis* are assumed to be similar (USDA, APHIS, 2003a).

Threatened and Endangered Species: There is no direct evidence that any endangered, threatened, proposed, or candidate species are hosts of the quarantine pests identified as likely to be included in the unmitigated importation of *Phalaenopsis* spp. orchids from Taiwan. The two insect pests, *P. minor* and *S. litura*, have hosts that are congeneric (occur within the same genus) with federally listed endangered, threatened, and candidate species (table 2). No hosts of the pathogens identified in the risk assessment are congeneric with any federally listed endangered, threatened, proposed, or candidate species. It should be noted that there is a level of uncertainty in the congeneric approach simply because a listed plant occurs within the same genus as known hosts of the identified quarantine pests represents a possible, not a probable, potential harm to these species.

Orchid species native to the United States that may be affected (as a result of habitat invasion) by the importation of moth orchids from Taiwan include *Cranichis ricartii* and *Lepanthes eltoroensis* (endangered, Puerto Rico), *Platanthera holochila* (endangered, Hawaii), *Spiranthes delitescens* (endangered, Arizona), *Piperia yadonii* (proposed endangered, California), *Isotria medeoloides* (threatened, Connecticut, the District of Columbia, Delaware, Georgia, Illinois, Massachusetts, Maryland, Maine, Minnesota, Mississippi, North Carolina, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, South Carolina, Tennessee, Virginia, and Vermont), *Spiranthes diluvialis* (threatened, Idaho, Colorado, Montana, Nevada, and Utah), and *Anoectochilus sandvicensis* and *Liparis hawaiiensis* (species of concern, Hawaii).

Table 2. Listed and candidate species that may be adversely affected by pests imported with moth orchids from Taiwan.*

Listed species	Status	Range	Pest with a host in the same genus as the listed species
<i>Amaranthus brownii</i> <i>A. pumilus</i>	E T	HI DE, MA, MD, NC, NJ, NY, RI, SC	
<i>Cucurbita okeechobeensis</i> ssp. <i>okeechobeensis</i>	E	FL	
<i>Cyperus trachysanthos</i>	E	HI	
<i>Euphorbia haeleeleana</i> <i>E. telephiooides</i>	E T	HI FL	
<i>Helianthus eggertii</i> <i>H. paradoxus</i> <i>H. schweinitzii</i> <i>H. verticillatus</i>	T T E C	AL, KY, TN NM, TX NC, SC AL, GA, TN	
<i>Justicia cooleyi</i>	E	FL	
<i>Manihot walkerae</i>	E	TX, MX	
<i>Rhus michauxii</i>	E	GA, NC, SC, VA	
<i>Solanum drymophilum</i> <i>S. incompletum</i> <i>S. nelsonii</i> <i>S. sandwicense</i>	E E C E	PR HI HI HI	
<i>Verbena californica</i>	T	CA	
<i>Vigna o-wahuensis</i>	E	HI	
<i>Ziziphus celata</i>	E	FL	
<i>Apios priceana</i>	T	AL, IL, KY, MS, TN	
<i>Allium munzii</i>	E	CA	
<i>Linum arenicola</i> <i>L. carteri carteri</i>	C C	FL FL	
<i>Manihot walkerae</i>	E	TX, MX	
<i>Trifolium ameonomum</i> <i>T. stoloniferum</i>	E E	CA AR, IL, IN, KS, KY, MO, OH, WV CA	
<i>T. trichocalyx</i>	E		
<i>Vigna o-wahuensis</i>	E	HI	

* Each listed plant is congeneric with a host of a quarantine pest (identified in the risk assessment as likely to follow the pathway in an unmitigated importation of *Phalaenopsis*). There are no proposed species identified because there are none that correspond to genera of pest hosts (USDA, APHIS, 2002b).

IV. Potential Environmental Impacts of the Proposed Action and Alternatives

A. Potential Environmental Impacts Common to Both Alternatives

The following environmental impacts would apply for either alternative should the pests identified in table 1 be imported with either bare rooted *Phalaenopsis* orchids (no action alternative) or with *Phalaenopsis* orchids in growing media (proposed rule) and establish in the United States.

Potential Invasiveness of Imported *Phalaenopsis*: No reports of invasiveness of *Phalaenopsis* spp. have been observed in key references recognized as standards (WSSA, 2002; Gunn and Ritchie, 1982; Holm *et al.*, 1979; Holm *et al.*, 1977; and Reed, 1977). In addition, there are no reports of invasiveness of *Phalaenopsis* orchids in the United States (including Hawaii and Florida) since bare rooted importations have been allowed to enter the country. The importation of orchids into the United States has occurred for decades, and they are shipped to all known habitats. The PLANTS database (<<http://plants.usda.gov>>) and other weed reporting services do not include reports of imported moth orchids as invasive or having weed potential.

Reports of orchids as weeds include *Monadenia bracteata* in Australia, which grows well in disturbed sites and flowers more abundantly after fire (Bates, 2002). An orchid recently identified as *Eulophia graminea* also is reported as an invasive species in Australia (Macrae, 2002). The introduced *Epipactis helleborine* is an orchid with few growth requirements (high environmental plasticity) that grows as a weed across much of the eastern United States (Anonymous, 1997). These characteristics differ from the basic biology of *Phalaenopsis*; therefore, the moth orchids are not expected to become invasive.

In Australia and the Hawaiian islands, the orchid *Epidendrum o'brienianum* is reported as invasive, and in pine and spruce plantations in Europe the boreal orchids, *Goodyera repens* and *Listera cordata*, are spreading (Adamowski, 1999). There is also a report that the African species *Oeceoclades maculata* is invasive in Southern and Central America (Adamowski, 1999). These invasive orchids share the following characteristics: quick development, self-pollination (autogamy), asexual reproduction through seeds (apomixis), wide ecological amplitudes, and broad natural distribution (Adamowski, 1999). The genus *Phalaenopsis* is

broadly distributed in Asia (Bailey and Bailey, 1976) but does not share any of the other characteristics.

The climate that favors *Phalaenopsis* is replicated in greenhouses and indoor environments (not less than 65 °F and either a humid atmosphere or unfailing moisture at the roots (Bailey and Bailey, 1976)) within most of the continental United States, which creates environmental and spatial barriers to plant introduction into native ecosystems. Moth orchids are native to Asia, the Malay archipelago, and Oceania (Bailey and Bailey, 1976). Although plants may be discarded, there is no evidence that these discards have the capacity to over-season out-of-doors outside of tropical and semi-tropical areas.

Moth orchids are epiphytes or rock-dwelling herbs (Bailey and Bailey, 1976). The physical environments that favor root growth are found in osmundia fiber or sphagnum moss (Wey *et al.*, 2001, and Bailey and Bailey, 1976) in pots (Griesbach, 2000). Moth orchids have light-intensity requirements (Konow and Wang, 2001, and Wang, 1995) in addition to nutrition (Wang, 1998; Duan and Yazawa, 1995; and Wang and Gregg, 1994) and mycorrhizal requirements (Clements, 1988). This means that a favorable combination of many factors is needed for moth orchids to grow. This contrasts with the habits of plants that tend to become problematic as invasive species (Mooney and Hobbs, 2000; Cox, 1999; Zimdahl, 1999; Devine, 1998; and Radosevich *et al.*, 1997). For these reasons, it is unlikely that *Phalaenopsis* species will become invasive in the future.

Potential negative effects to listed members of the Orchidaceae are not expected because the host ranges for the quarantine pests do not overlap or are not within the same genus (congeneric) as *Phalaenopsis*. The listed species *Isotria medeoloides* occurs in many places within the continental United States and is primarily threatened by loss of habitat (NatureServe, 2002). This contrasts with *Phalaenopsis* which requires temperatures greater than 65 °F and either a humid atmosphere or unfailing moisture at the roots (Bailey and Bailey, 1976). Similarly, the listed species *Platanthera leucophaea* occurs in colder climates such as Iowa, Illinois, Indiana, Missouri, New York, Ohio, Pennsylvania, Oklahoma, Virginia, and Wisconsin (NatureServe, 2002). The taxonomically related *P. praeclara* also occurs in areas likely to be too cold for moth orchids such as Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and Oklahoma (NatureServe, 2002).

The listed species, *Spiranthes diluvialis*, which was originally known only Colorado, Utah, and Nevada is now reported to also occur in Wyoming, Montana, Nebraska, and Idaho, where the temperatures are likely to support

Phalaenopsis, even though *S. diluvialis* grows in lower-elevation wet meadow habitats (NatureServe, 2002). In contrast, the listed species *Spiranthes delitescens* occurs in Arizona (NatureServe, 2002), where the climate is likely to be too dry for moth orchids to survive out-of-doors (Bailey and Bailey, 1976). *Spiranthes parksii* is reported as variable and robust, exhibiting hybrid vigor because it is believed to be either a polyploid member of the *S. cernua* complex or it is a nonpersisting hybrid of *S. lacera* var. *gracilis* and *S. cernua* (NatureServe, 2002). It occurs in open, grassy woodland sites in Texas that are likely to be exposed to heavy cattle grazing (NatureServe, 2002). The soil types that support grassy woodlands are unlikely to be able to provide the physical and nutritional requirements of moth orchids which are either epiphytes or, less commonly, rock-dwelling herbs (Bailey and Bailey, 1976).

The two endangered species found in Puerto Rico, *Cranichis ricartii* and *Lepanthes eltoroensis*, along with the Hawaiian *Platanthera holochila*, occur in climates similar to those preferred by moth orchids with respect to temperature and moisture (NatureServe, 2002). While the risk of *Phalaenopsis* becoming established out-of-doors in those areas is increased, the ability of this genus to grow at high altitudes has not been reported. It is unlikely that seed from moth orchids will be dispersed into the remote high altitude habitats of the two Puerto Rican orchids (FWS, 1992). There is no evidence that the *Phalaenopsis* species can grow in raised hummocks of fine organic mold found in large bogs (montane bog) which is the habitat for the Hawaiian *Platanthera holochila* (NatureServe, 2002, and Anonymous, 2003). Lack of habitat does not appear to limit *P. holochila* (NatureServe, 2002), so it is unlikely that moth orchids would compete with this plant for habitat.

Consequences of Pest Introduction: Several arthropod pests (*P. minor* and *S. litura*), mollusks (*A. tourranensis* and other *Bradybaena* spp.), and fungi (*C. phalaenopsidis*, *P. orchidophila*, and *S. phalaenopsidis*) were identified as quarantine pests likely to be imported with unmitigated shipments of *Phalaenopsis* spp. moth orchids, possibly requiring phytosanitary measures to mitigate risk. In addition, commenters on this EA have suggested that certain biting flies in the insect family Ceratopogonidae may be introduced via sphagnum moss growing media from Taiwan into Hawaii.

Insects: Although distributed in the U.S. Virgin Islands (ScaleNet, 2002, (<<http://www.sel.barc.usda.gov/scalenet/scalenet.htm>>)), there has been only one interception of the mealybug, *P. minor*, on *Phalaenopsis* spp. (USDA, APHIS, 2003b). Mealybug crawlers readily move from plant to plant among closely placed plants. The host range of *P. minor* includes

more than 100 species in over 60 families (ScaleNet, 2003), although its primary hosts include taro (*Colocasia esculenta*), potato (*Solanum tuberosum*), cocoa (*Theobroma cacao*), Mediterranean mandarin (*Citrus deliciosa*), mandarin (*Citrus reticulata*), coffee (*Coffea*), mango (*Mangifera indica*), banana (*Musa*), common guava (*Psidium guajava*), grapevine (*Vitis vinifera*), and *Ziziphus* (CPC, 2002). *S. litura* causes major damage to tobacco, cotton, chilies, cabbage, and other crops and has a host range of at least 120 species (CPC, 2002). Most damage by *S. litura* is caused by larval foliar feeding, but larvae may also injure cotton bolls and corn stalks and ears. This insect has high dispersal capability and potential for a high level of economic impact if it were to become established in the United States.

In addition to quarantine significant plant pests identified in the risk assessment, several commenters from Hawaii raised the potential for importation of Ceratopogonid biting flies with *Phalaenopsis* spp. orchids in sphagnum moss growing media. *Forcipomyia taiwana* is a 1.4 mm annoying, blood sucking fly found throughout Taiwan (Chuang *et al.*, 2000). Also, *Culicoides* spp. are known to occur in Taiwan that may vector various animal diseases. In Taiwan, *C. arakawai* is known to transmit leucocytozoonosis, a disease prevalent in open chicken houses in southern and eastern Asia (Yu *et al.* 2000). There is no evidence that these insects infest greenhouse-grown plants or are pests of greenhouses. Ferns from Taiwan are known to be imported in sphagnum moss, and are eligible for importation into Hawaii.

Mollusks: The mollusks *Bradybaena* spp. and *A. tourannensis* are snails that chew holes in foliage, flowers, and fruit, especially in greenhouses. There are no reports of populations of *A. tourannensis* established from the importation of bare rooted *Phalaenopsis* plants into the continental United States to date, and it is rarely intercepted on these plants. However, snails are spread in commerce and, due to their hermaphroditism (both sexes within one individual), one snail can start a population (Godan, 1983). More than 10 families of plants are listed as hosts for *A. tourannensis*, including both herbaceous and tree species (Lai, 1984). If this pest established, it would be likely to disrupt unmanaged ecosystems in the subtropical areas of Hawaii, Florida, and other climatically similar areas (USDA, APHIS, 2003a). *Bradybaena similaris* (Ferussac), a tropical species from China, already exists in Hawaii and Louisiana (Burch, 1962). *A. tourannensis*, present in southern Taiwan, has not spread to other areas of Asia, indicating low natural dispersal capabilities may exist (Wu, 1982).

Pathogens: In the 1997 risk assessment document, the host range for the pathogens *C. phalaenopsidis* and *S. phalaenopsidis* was assumed to be only *Phalaenopsis*, and there is no evidence to the contrary as of this

date. Spores may be splashed by irrigation or rain onto nearby hosts or carried by insects, animals, and humans moving among plants. *P. orchidophila* is reported on the stems and leaves of species of *Catasetum*, *Cattleya*, *Coelogyne*, *Cymbidium*, and *Phalaenopsis* (Uecker, 1988). Fungi in this genus produce air-dispersed spores that are not likely to be dispersed over long distances (USDA, APHIS, 2003a). Typically, leaf-spot causing pathogens, such as *C. phalaenopsisidis*, *P. orchidophila*, and *S. phalaenopsisidis*, reduce visual quality and decrease the value of ornamental crops and reduce available photosynthetic area and plant vigor. It is not reasonable to assume that these fungi will infect host plants *ad infinitum* (USDA, APHIS, 2003a).

Consequences to Hawaii, Florida, and Climactically Similar Areas:

Hawaii receives more nonindigenous species annually than any other State, and has the greatest proportion of these species established in the wild (OTA, 1993). Hawaii also has the greatest concentration of threatened and endangered species in the United States, has the greatest number of extinct species, and is the State most distinctly affected by nonindigenous species (OTA, 1993).

In Florida, nonindigenous species have also had major impacts including degradation of wildlife habitat, decreased biological diversity, altered natural ecosystems, and negative effects on fishing and water sports (OTA, 1993). There is concern that because Taiwan is climactically similar to Hawaii and Florida, as well as California, and United States possessions and trust territories, such as Guam, the Northern Mariana Islands, American Samoa, and Puerto Rico, that nonindigenous species imported with orchids from Taiwan are more likely to become established in these areas. Many of these areas have already been heavily impacted by nonindigenous species, despite State and Federal efforts to prevent them.

B. Risk Management

Although the affected environment and the environmental consequences under both the no action alternative and the proposed action alternative are the same, the risk management to prevent the introduction of pests differs between the two alternatives. The following section discusses the phytosanitary measures imposed under the current importation scheme of bare rooted *Phalaenopsis* spp. orchids (no action alternative) and the proposed phytosanitary measures for the import of these plants in growing media (preferred alternative).

Phytosanitary Measures of Alternative A: No Action

This section describes the phytosanitary measures of the no action alternative that would leave 7 CFR part 319 unchanged. Currently, *Phalaenopsis* and other orchids are imported as bare rooted plants or growing on tree fern slabs or in coconut husk or fiber (7 CFR § 319.37–8(d)). All forms are enterable subject to inspection findings at designated ports of entry, i.e., ports associated with facilities where propagative material can be examined (plant inspection stations). All orchid consignments must be accompanied by a USDA permit and a phytosanitary certificate issued by BAPHIQ. This document certifies that the orchids have been inspected and found free of quarantine pests before shipment to the United States. No special growing conditions are required for these plants. *Phalaenopsis* spp. plants imported bare rooted generally do not have buds or flowers and roots are not hidden from view within growing media and, thus, visual inspection of these plants at the port of entry is effective.

Inspection of bare rooted orchid consignments are conducted by PPQ at a plant inspection station at the first port of entry in the United States. These stations are staffed with PPQ pest identification specialists, as well as PPQ officers, who carefully examine orchid consignments. Inspection and examination may be limited to a verification of the contents and a review of the documentation or may consist of a standard inspection, including an inspection of at least 2 percent of the plants in the shipment. If quarantine pests are discovered on bare rooted orchid consignments, appropriate phytosanitary measures are conducted (e.g., treatment, destruction, return of consignments to exporting country).

Phytosanitary Measures of Alternative B: Amend Regulations According to the Proposed Rule

This section describes the phytosanitary measures required if *Phalaenopsis* spp. plants in approved growing media are imported into the United States from Taiwan. Amendment of 7 CFR part 319, according to the proposed rule, would allow importation of *Phalaenopsis* spp. moth orchids from Taiwan rooted in approved growing media, provided the orchids were produced, handled, and imported in accordance with the requirements of 7 CFR § 319.37–8(e) and are accompanied at the time of importation by a phytosanitary certificate issued by BAPHIQ declaring that those requirements have been met.

Systems Approach: To effectively prevent the introduction of plant pests associated with plants grown in approved media, a series of important safeguards, conditions, or phytosanitary measures must be in place. The risk

management program used for plants in media is the systems approach, a defined set of phytosanitary procedures, at least two of which have an independent effect in mitigating pest risk associated with the movement of commodities. This approach relies on a series of phytosanitary measures that, individually and cumulatively, reduce the pest risk posed by pests that may be associated with plants. All phases associated with plants established in growing media—before planting, during the growing period, post harvest, during transport, and importation—are considered. The APHIS regulation on plants in media requires multiple phytosanitary measures designed to reduce the pest risk. The overall systems approach operates like a fail-safe system in that tiered safeguards are built into the process. That is, if one mitigating measure fails, other safeguards exist to ensure that the risk is progressively reduced and managed. The systems approach is designed to apply all the measures to obtain the maximum risk reduction and to apply additional safeguards as required. The steps or measures may be overlapping or redundant to assure an adequate reduction in pest risk and that the reduction is maintained during the entire process. These measures would be applied to the importation of *Phalaenopsis* spp. orchids from Taiwan in approved growing media.

Approved Plant Sources: The orchids imported into the United States will be greenhouse- or laboratory-propagated plants or may be propagated in the laboratory from aseptic tissue culture. Wild or collected specimens or nondomesticated plants are not approved for importation into the United States. The plants must come from pest-free mother stock, as determined by a PPQ or BAPHIQ inspector, no more than 60 days prior to the time the plants are established in the greenhouse.

Approved Growing Media: Plants offered for importation into the United States must be free of sand, soil, earth, and other unapproved growing media. This requirement helps prevent the introduction of plant pests that might be present in and around the roots and also eliminates many soil and root associated saprophytic organisms. Exceptions to the growing media requirement reflect additional factors that mitigate plant pest risk. Those exceptions consider either the origin of the plants and the growing media (7 CFR § 319.37–8(b)), the nature of the growing media (§§ 319.37–8(c), (d)), or the use of a combination of growing conditions, approved media, inspections, and other requirements (§ 319.37–8(e)). Soil-less and new, unused growing media eliminates an initial source for pests, including *A. tourranensis*. The relatively low pH of sphagnum is associated with conditions that do not favor bacterial and some types of fungal growth. Studies on APHIS-approved growing media found that pathogens are not present (Palm, 1994 and Santacroce, 1991).

Agreements: The orchids must be grown in accordance with written enforcement agreements among APHIS, BAPHIQ, and Taiwanese growers. This will include the preparation of an operational workplan that outlines specific detection and eradication protocols to detect problem pests and eliminate them before the orchids are exported to the United States. The workplan also outlines how the program will be monitored and supervised to ensure compliance. Taiwanese orchid growers who plan to export moth orchids in growing media must be registered with BAPHIQ; any grower not complying with the workplan requirements will be eliminated from the program.

Exclusionary Greenhouse: The orchids for shipment must be grown in a pest exclusionary greenhouse using the following phytosanitary measures: “Grown solely in a greenhouse in which sanitary procedures are adequate to exclude plant pests and diseases are always employed, including cleaning and disinfection of floors, benches, and tools, and the application of measures to protect against any injurious plant diseases, and injurious insect pests, and other plant pests” (7 CFR § 319.37–8(e)(2)(ii)). These measures may include trapping, surveying, and scouting to determine if pests are present, and pesticide applications or other control measures to eliminate pests that are discovered.

Raised Benches: The height of the benches on which the orchids are grown must be at least 46 cm above the floor. Raised benches reduce the chance of water being splashed onto benches from the floors that might be contaminated with nematodes, pathogens, and weed seeds. Also, because snails and slugs have the capability to climb up sidings and posts, higher benches make it more difficult for snails and slugs to climb and decrease the chances that such pests will invade the plants and media.

Floors: Greenhouse floors must be completely void of soil and must be composed of permanent material that can be cleaned and sanitized to destroy pathogens and nematodes and prevent establishment of weeds.

Automatic Doors: Automatic closing doors are required to exclude flying insects from entering the growing area. They are also used, to a limited extent, to keep windborne pests from being blown into the growing area.

Screens: Greenhouses have vents or openings principally for the exchange of outside air and for temperature control. The addition of screens to these openings lowers the risk of certain pests entering the greenhouse. Screens must have openings no larger than 0.6 mm. Screens with 0.6 mm

openings do not exclude all pests; however, they will act as a deterrent or barrier to many pests, including *S. litura* and the biting fly *F. taiwana*.

Sanitation: Sanitary procedures must be used to maintain the greenhouse relatively free of pests. A suitable disinfectant should be employed to sanitize the greenhouse interior prior to plantings to reduce pathogens, nematodes, and other pests. These procedures should also include keeping tools, hoses, benches, floors, work areas, and floor benches clean and properly sanitized. The grower should maintain a record of the times disinfection takes place.

Detention Periods: Plant materials are commonly detained to allow time for certain pests to develop and become visible and detectable. Mother stock orchids must be grown in Taiwan for at least 9 months prior to export of descendant orchids to the United States. Mother plants imported into Taiwan from another country must be grown at least 12 months in Taiwan prior to the export of descendant orchids to the United States. The growing period can be reduced to 9 months, as above, provided there is a prescribed treatment of the mother stock upon importation of that plant into Taiwan. Descendant plants in media must be rooted and grown in an active state of foliar growth for at least 4 consecutive months prior to export. Detention periods are necessary to allow ample time for the expression of disease, symptoms, and other signs of pests.

Clean Water Sources: The water source must be either rainwater that has been boiled or pasteurized, clean well water, or potable water. Water is considered one of the principal means for the dispersal of plant pests, including pathogens and mollusks; water from clean sources must be used throughout the entire system.

Phytosanitary Certificate: A phytosanitary certificate must be issued by BAPHIQ. This document must accompany the plants during importation and certifies that the required growing conditions were met.

Inspection: Inspections are an integral phytosanitary measure to reduce pest risk. In growing areas in Taiwan, inspection of *Phalaenopsis* spp. orchids in growing media is primarily the responsibility of BAPHIQ. Whenever pests of quarantine significance are found during inspection, appropriate action must be taken promptly, as outlined in the operational workplan.

Mother stock must be inspected by a PPQ or BAPHIQ inspector no more than 60 days prior to the time the orchids are established in the greenhouse

and found free of evidence of diseases and insect pests. The rationale is to inspect the mother stock in advance to ensure a pest-free source of plant material used for descendant plants. Inspection may take place at any time within the 60-day period. Inspection of mother stock is a primary measure to prevent the introduction of pests such as mollusks, insects, and pathogens into greenhouse crops.

For descendant plants, an inspection must be performed no more than 30 days prior to the date of export and must be done on the premises or site where the orchids are grown to prevent contaminants and hitchhikers from entering the shipment. Because the roots cannot be visually examined while they are in growing media, a small number of plants will be removed from the media to examine the roots and inside of the media ball.

APHIS inspectors will visit Taiwan periodically to ensure that the program is working adequately, including review of treatment and control records generated by registered Taiwanese growers.

At the port of entry in the United States, inspection of orchid consignments will be conducted by PPQ at plant inspection stations. These stations are staffed with PPQ pest identification specialists, as well as PPQ officers, who will carefully examine orchid consignments. Generally, initial consignments from a newly approved importation program (such as would be orchids in approved growing media) are subjected to extremely rigorous inspections that include removal of plants from pots to examine roots and growing media. Later, the inspection and examination may be limited to a verification of the contents and a review of the documentation or the inspection may consist of a standard inspection of at least 2 percent of the plants in the consignment, including roots and growing media. Standard inspection techniques are highly likely to detect larger mature and juvenile forms of the mollusk, *A. tourranensis*, present on plants (Robinson, 2002). Small eggs in soil are highly likely to escape detection; however, plants produced in APHIS-approved growing media under pest-exclusionary conditions are expected to be free of mollusk eggs. Standard visual inspection techniques are not likely to detect microscopic crawler stages of the mealybug, *P. minor*, although adults are easily detected. The larvae of *S. litura* can be up to 45 mm in length and are on plant surfaces where they are readily detected, although eggs hidden between leaves, in media, or within flowers are more difficult to detect. The pathogens *C. phalaenopsisidis*, *P. orchidophila*, and *S. phalaenopsisidis* infect leaves causing leaf spots that are easy for trained inspectors to detect. Latent infections are more difficult to detect. However, plants produced in APHIS-approved growing media under pest-exclusionary conditions are expected to be free of these pests.

If interceptions of quarantine pests are made on a large portion of orchid consignments or if a single quarantine pest is detected often, PPQ will require more specific mitigation against the pest(s) of concern. Registered greenhouses in Taiwan will allow specific problem greenhouses or growers to be easily identified. In addition, if quarantine pests are discovered on moth orchid consignments at the port of entry, appropriate phytosanitary measures will be conducted (e.g., treatment, destruction, or return of consignment to exporting country).

Packing and Storing: Plants for export must be packed and stored in areas free of sand, soil, earth, and plant pests. Packages should be such to prevent contamination and the introduction of hitchhikers. *Phalaenopsis* plants shall not be packed in the same container as prohibited articles.

Conclusions

The program has determined that quarantine pests are effectively removed from the pathway and effectively precluded from establishment in the United States by the mitigation measures already present in the applicable regulations. The risk assessment has determined that importation of moth orchids (*Phalaenopsis* spp.) from Taiwan under the conditions required by 7 CFR § 319.37–8(e) poses no greater pest risks than the risks presented by other epiphytic orchid material currently allowed entry as bare rooted plants. The same pests identified in the pest risk assessment that may be imported with orchids in growing media may be imported with consignments of bare rooted orchids currently being imported into the United States. The risk assessment concluded that application of additional safeguards will reduce the risk posed by the importation of *Phalaenopsis* spp. moth orchids in approved growing media to a low level, that will be the same level or below the level posed by currently permitted bare rooted importations (USDA, APHIS, 2002b).

If quarantine pests accompanying *Phalaenopsis* shipments were to become established in the United States, an eradication program would likely be initiated. Although eradication of any nonindigenous pest would require the use of pesticides, APHIS would prepare the necessary environmental documentation under the National Environmental Policy Act (NEPA) and the Endangered Species Act (ESA) in advance of any eradication activities.

Other Environmental Statutes and Executive Orders

Endangered Species Act

Section 7 of the ESA and the ESA's implementing regulations require Federal agencies to consult with the U.S. Fish and Wildlife Service (FWS) and/or the National Marine Fisheries Service to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of critical habitat.

APHIS submitted a biological evaluation (BE) (USDA, APHIS, 2002b) to FWS, Arlington, VA, in compliance with Section 7 of the ESA. Based on the information provided in the BE and additional supporting documentation, FWS concurred with APHIS' determination that the importation of *Phalaenopsis* spp. orchids from Taiwan will not adversely affect federally listed or proposed endangered or threatened species or their habitats.

Executive Orders

Executive Order (EO) 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," focuses Federal attention on the environmental and human health conditions of minority and low-income communities and promotes community access to public information and public participation in matters relating to human health or the environment. The EO requires Federal agencies to conduct their programs, policies, and activities that substantially affect human health or the environment in a manner so as not to exclude persons and populations from participation in or benefitting from such programs. It also enforces existing statutes to prevent minority and low-income communities from being subjected to disproportionately high and adverse human health or environmental effects. Neither alternative poses disproportionately high or adverse human health or environmental effects to any specific minority or low-income group.

EO 13045, "Protection of Children from Environmental Health Risks and Safety Risks," acknowledges that children may suffer disproportionately from environmental health and safety risks because of their developmental stage, greater metabolic activity levels, and behavior patterns, as compared to adults. The EO, (to the extent permitted by law and appropriate, and consistent with the agency's mission) requires each Federal agency to consider environmental health risks and safety risks that may disproportionately affect children. Neither alternative is expected to have

disproportionately high or adverse human health or environmental effects to children.

V. Listing of Agencies and Persons Consulted

Environmental Services
Policy and Program Development
Animal and Plant Health Inspection Service
U.S. Department of Agriculture
4700 River Road, Unit 149
Riverdale, MD 20737-1238

Phytosanitary Issues Management
Plant Protection and Quarantine
Animal and Plant Health Inspection Service
U.S. Department of Agriculture
4700 River Road, Unit 140
Riverdale, MD 20737-1228

Regulatory Coordination
Plant Protection and Quarantine
Animal and Plant Health Inspection Service
U.S. Department of Agriculture
4700 River Road, Unit 141
Riverdale, MD 20737-1228

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**Finding of No Significant Impact
for
Proposed Rule for Importation of Moth Orchids (*Phalaenopsis* spp.) in Approved
Growing Media from Taiwan
Environmental Assessment
December 2003**

The U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), has prepared an environmental assessment (EA) that analyzes potential environmental consequences of a proposal to amend the regulations governing the importation of plants in approved growing media. This is a proposed rule to allow *Phalaenopsis* spp. moth orchids in approved growing media to be imported from Taiwan, subject to certain conditions. The EA, incorporated by reference in this document, is available from—

U.S. Department of Agriculture
Animal and Plant Health Inspection Service
Plant Protection and Quarantine
Phytosanitary Issues Management
Import and Interstate Services
4700 River Road, Unit 140
Riverdale, MD 20737-1237

The EA analyzed two alternatives—approval of the proposed rule and no action. The no action alternative is defined as continuation of the current program for phytosanitary regulation of *Phalaenopsis* spp. moth orchids imported from Taiwan. Both of the alternatives have some environmental impacts, including the no action alternative.

I have decided to approve the proposed rule to amend the regulations for importation of plants and plant products to add orchids of the genus *Phalaenopsis* from Taiwan to the list of plants that may be imported in approved growing media, subject to specified growing, inspection, and certification requirements. The reasons for my decision are:

- The PPQ risk analysis determined that importation of *Phalaenopsis* spp. orchids from Taiwan under the conditions required by 7 Code of Federal Regulations § 319.37–8(e) poses no greater pest risks than the risk presented by orchids currently allowed entry into the United States as bare rooted plants.
- Implementation of the proposed rule will not significantly impact the quality of the human environment.
- Importation of *Phalaenopsis* spp. orchids from Taiwan in approved growing media will not adversely affect threatened or endangered species or their habitats.

- Implementation of the proposed rule poses no disproportionate adverse effects to minority populations, low income populations, or children, as consistent with Executive Order (EO) 12898, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations” and EO 13045, “Protection of Children from Environmental Health Risks and Safety Risks”.

Lastly, because I have not found evidence of significant environmental impact associated with the proposed amendment in the phytosanitary regulations, I find that an environmental impact statement does not need to be prepared.

/s/

Paul Eggert
for
Richard Dunkle
Deputy Administrator
Plant Protection and Quarantine
Animal and Plant Health Inspection Service

December 18, 2003

Date