Submitted by the
New Jersey Department of Environmental Protection

Section 18 Quarantine Exemption Request
For the use of
bifenthrin
To control brown marmorated stink bug **in** tree fruit (peach, nectarine and apple) **in the State of New Jersey**

Contact Person and Qualified Expert (166.20(a)(1))

CONTACT PERSON:

Name:
Title:
Organization: NJDEP
Pesticide Control Program
Address: P.O. Box 411
Trenton, New Jersey 08625-0411
Phone: (609) 984-6901
FAX: (609) 984-6555
E-MAIL:

QUALIFIED EXPERT:

Name: Dean Polk
Title: Statewide Fruit IPM Agent
Organization: Rutgers University, Rutgers Cooperative Extension
Address: Dept. of Agriculture and Natural Resources
Rutgers Agricultural Research and Extension Center
121 Northville Rd.
Bridgeton, NJ 08302-5919
Phone: (856) 455-3100 ext 4166
FAX: (856) 455-3133
E-Mail: deanpolk@NJAES.rutgers.edu

DESCRIPTION OF PESTICIDE REQUESTED (166.20 (a) (2))

Pesticides requested: Bifenthrin
Common Chemical Name (Active Ingredient): Bifenthrin
Trade Names(s)And EPA Reg. No.: Brigade, Bifenture
Formulation: Brigade WSB, Bifenture 10DF, Bifenture EC
% Active Ingredient: Brigade WSB – 10% (EPA Reg No. 70506-57), Bifenture 10DF – 10% (EPA Reg No. 70506-227), Bifenture EC – 25.1% (EPA Reg No. 279-3108)
Registrant: Brigade – FMC, Bifenture – UPI (United Phosphorous, Inc.)

NAME OF PEST

Scientific Name: *Halyomorpha halys* (Stål) (Hemiptera: Pentatomidae)
Common Name: brown marmorated stink bug (BMSB)
Overview of pest/disease phenology in New Jersey: BMSB overwinters as an adult in a state of facultative diapause. The influence of potential mortality factors on the survivorship of this generation of BMSB in the eastern US has not been investigated. Adults emerge from overwintering sites in April and May and begin mating approximately two weeks later. Although females commonly mate several times, a single mating can result in egg production over half of their lives. Females typically deposit eggs in clusters on the undersides of leaves. Each egg mass contains ~28 eggs, and the reports of the average total number of eggs deposited per female range from about 212 to about 486. Unlike the native species of stink bugs, whose nymphs feed on broadleaf weeds and other hosts outside the orchard, BMSB females also deposit eggs on orchard trees and nymphs and feed and complete their development on pome and stone fruit. Development from egg to adult, including five nymphal instars, required approximately 50 d.

BMSB populations in central NJ and PA have one generation per year during most years, while with early springs accompanied with warm growing seasons, two generations are possible. Overlapping nymphal and adult populations from these two generations in parts of the Mid-Atlantic region create a scenario in which tree fruit crops may be at continuous risk of attack. Because up to six generations per year can occur in the southern parts of its range in China, BMSB is expected to show multiple generations in southern regions of the USA.

BMSB has pronounced dispersal behaviors and movement patterns. In spring, populations move from overwintering sites in woodlots, rock outcrops, and buildings in search of host plants, including tree fruit crops. During the growing season, BMSB can move back and forth between native hosts and crops and between different crops. Although the timing of this movement in relation to its phenology or that of its different hosts is poorly understood, the potential for ongoing immigration of BMSB into tree fruit orchards during the growing season is a major concern. In late September and October, the BMSB adults return to overwintering sites, often as massive aggregations consisting of thousands or tens of thousands of individuals. It is often during late August and September that the most severe damage to late season peaches and apples occurs, prior to the insect's invasion of buildings for overwintering.

DESCRIPTION OF PROPOSED USE (166.20 (a)(3))

Sites to be Treated: Apple, peach and nectarine acreage throughout NJ, especially Cumberland, Salem, Gloucester, Camden, Atlantic, Cape May, Burlington, Sussex, Warren, Hunterdon, Mercer, Middlesex, Monmouth, Morris, Somerset Counties; totaling 5,500 acres of peaches and nectarines and 2,000 acres of apples.

Method of Application: Ground

Rate of Application in terms of active ingredient (a.i.): 0.08 to 0.2 lb ai per acre with no more than 0.5 lb ai per acre applied per year.

Frequency / Timing of Application: Multiple applications can be made at a minimum of 30 day intervals; a restricted entry interval (REI) of 12 hours and a pre-harvest interval (PHI) of 14 days.

Maximum Number of Applications:

Total Acreage to be Treated – Maximum of 7,500 acres of apple, peach and nectarines.

Date First Application Needed: May 1, 2018

Date Last Application is Needed: October 15, 2018

Use Season/Duration of use (period of time for which use of chemical is requested: May 1, 2018 – October 15, 2018

Restricted Entry Interval (REI): 12 hours

Preharvest Interval (PHI): 14 days

Additional Restrictions, User Precautions & Requirements of Applicators: No more than 0.50 lbs ai per acre per season

ALTERNATIVE METHODS OF CONTROL (166.20(a)(4))

Registered Alternative Pesticides:
Table 1. Insecticides registered for use in **one or more pome and/or stone fruits** that are labeled for use against stink bugs*

Class	Active ingredient	Trade name(s)
Organophosphates	chlorpyrifos	Lorsban and generics
	dimethoate	Dimate
Carbamates	methomyl	Lannate
Pyrethroids	beta-cyfluthrin	Baythroid XL and Leverage
	bifenthrin	Bifenture
	cyfluthrin	Tombstone
	esfenvalerate	Asana
	fenpropathrin	Danitol
	gamma-cyhalothrin	Declare, Proaxis
	permethrin	Perm-Up
	lambda-cyhalothrin	Warrior and generics, Voliam Xpress, Endigo
	zeta-cypermethrin	Mustang Max
Neonicotinoids	acetamiprid	Assail
	thiamethoxam	Actara, Voliam Flexi, Endigo
	Dinotefuran	Venom and Scorpion
	clothianidin	Belay

* Only products considered Good or Excellent against native stink bugs are included, based on various efficacy tests in Mid-Atlantic states by Rutgers Cooperative Extension, Pennsylvania State University Cooperative Extension, Cornell/NYSAES, University of Maryland, and Virginia Cooperative Extension.

Some of these products are good for brown marmorated stink bug control, but **non are as effective as bifenthrin.** Only some of these products are registered for use in peaches/nectarines and apples at the times needed for control. There are no non-insecticide methods for controlling BMSB on orchards.

EFFICACY OF USE PROPOSED UNDER SECTION 18 (166.20(a)(5))

Laboratory bioassays examining the response of adult BMSB after 4.5 hours of exposure to dried insecticide residues on glass surfaces (Leskey et al, unpubl. data) showed that bifenthrin was the most active of the pyrethroid insecticides tested. BMSB adults succumbed to exposure to dried bifenthrin residue as quickly or more quickly compared to other insecticides, no bugs recovered from exposure over 7-days, and mortality after 7 days was highest. Field monitoring in New Jersey and in neighboring states that have obtained bifenthrin section 18 labels, have shown that BMSB field control was excellent in both peach and apple plantings.

BMSB is an edge related pest, in that is has many alternate host, and moves between those host plants throughout the growing season. Unlike other stink bugs, BMSB can reproduce and spend its entire life cycle in peach and nectarine orchards. Depending on the proximity to alternate hosts, the ripening season of the fruit, and population pressure, BMSB damage may be very high and require weekly full cover applications of effective insecticides. This kind of intensive pest management program demands an effective resistance management strategy. Resistance management may consist of rotating chemistries, using no more than 2 consecutive applications of any one chemistry, pest monitoring and applying only when pests are present, and targeting applications where BMSB is most likely to occur. New Jersey and other Mid-Atlantic trials have demonstrated that border sprays with BMSB effective insecticides, when used in combination with herbicide management of the orchard ground cover for tarnished plant bug and mating disruption for oriental fruit moth, also add an effective tool for minimizing insecticide use and adding a resistance management component.

The single most important part of a resistance management program is to have as many IRAC mode of action types available of the most effective chemistries. Less effective chemistries are often used more often to compensate for the lack of effectiveness. Since bifenthrin is the most effective product available for BMSB control, it will easily be integrated into effective IPM and resistance management programs.

EXPECTED RESIDUE LEVELS IN FOOD (166.20(a)(6))

Expected residues are as stated in: The Electronic Code of Federal Regulations as of march 6, 2018
https://www.ecfr.gov/cgi-bin/retrieveECFR?gp=&SID=9496c0f592f3203e27697ada6907846c&mc=true&n=pt40.26.180&r=PART&ty=HTML - se40.26.180_1442

at .5 ppm – expires 12/31/18

DISCUSSION OF RISK INFORMATION (166.20(a)(7))

Application will be restricted to commercial pome and stone fruit orchards. Proximity of these sites to residential areas, aquatic systems or endangered or threatened species habitiats, soil types, etc. will vary.

The following is copied directly from the Brigade section 3 label:

“This pesticide is extremely toxic to fish and aquatic invertebrates. Use with care when applying in areas adjacent to any body of water. Do not apply directly to water, to areas where surface water is present or to intertidal areas below the mean water mark. Do not make applications when weather conditions favor drift from treated areas. Drift and runoff from treated areas may be hazardous to aquatic organisms in neighboring areas. Do not contaminate water when disposing of equipment washwaters.

This product is highly toxic to bees exposed to direct treatment or residues on blooming crops or weeds. Do not apply this product or allow it to drift on blooming crops or weeds while bees are actively visiting the treatment area.

The use of bifenthrin is prohibited in areas that may result in exposure of endangered species to bifenthrin. Prior to use in a particular county contact the local extension service for porcedures and precautions to use to protect endangered species.”

Past section 18 labels for bifenthrin in NJ have also stated:

1. To help minimize exposure to pollinators, the following statement on the application timing must be observed: "Do not apply this product until after petal fall."
2. To mitigate risks to aquatic organisms, section 3 product label requirements must be strictly followed. For ground applications (the only method allowed under this exemption) 10 ft vegetative buffer strip, or 25 ft buffer zone is required between the site of application and adjacent bodies of water. Recommendations on the section 3 product labels regarding droplet size, wind direction and speed, temperature inversions, and other factors affecting off-site drift or runoff of bifenthrin must also be carefully followed.

Threatened and Endangered Species in New Jersey

The list of Federal and State threatened and endangered species for New Jersey can be found at the following websites: http://ecos.fws.gov/tessyublicfTESSWebpageUsaLists?state=nj

Endangered Species in NJ
From the NJ Division of Fish and Wildlife, NJDEP
http://www.state.nj.us/dep/fgw/tandespp.htm

Endangered Species are those whose prospects for survival in New Jersey are in immediate danger because of a loss or change in habitat, over-exploitation, predation, competition, disease, disturbance or contamination. Assistance is needed to prevent future extinction in New Jersey.

Threatened Species are those who may become endangered if conditions surrounding them begin to or continue to deteriorate.

There are other classifications for wildlife as well, including Stable, Species of Special Concern Special Concern and Undetermined.

Species names in the below tables link to PDF documents containing identification, habitat and status and conservation information. Additionally, in 2003 twelve species were highlighted as part of the celebration of the 30th anniversary of the NJ Endangered Species Conservation Act. See the "2003 Species of the Month" page for more information.

BIRDS			
Endangered		**Threatened**	
Bittern, American BR	*Botaurus lentiginosos* BR	Bobolink BR	*Dolichonyx oryzivorus* BR
Eagle, bald BR	*Haliaeetus leucocephalus* BR	Eagle, bald NB	*Haliaeetus leucocephalus* NB
Falcon, peregrine BR	*Falco peregrinus* BR	Egret, cattle BR	*Bubulcus ibis* BR
Goshawk, northern BR	*Accipiter gentilis* BR	Kestrel, American	*Falco sparverius*
Grebe, pied-billed BR	*Podilymbus podiceps* BR	Lark, horned BR	*Eremophila alpestris* BR
Harrier, northern BR	*Circus cyaneus* BR	Night-heron, black-crowned BR	*Nycticorax nycticorax* BR
Hawk, red-shouldered BR	*Buteo lineatus* BR	Night-heron, yellow-crowned	*Nyctanassa violacea*
Knot, red NB	*Calidris canutus* NB	Osprey BR	*Pandion haliaetus* BR
Owl, short-eared BR	*Asio flammeus* BR	Owl, barred	*Strix varia*
Plover, piping**	*Charadrius melodus***	Owl, long-eared	*Asio otus*
Rail, black BR	*Laterallus jamaicensis* BR	Rail, black NB	*Laterallus jamaicensis* NB
Sandpiper, upland	*Batramia longicauda*	Sparrow, grasshopper BR	*Ammodramus savannarum* BR
Shrike, loggerhead NB	*Lanius ludovicianus* NB	Sparrow, Savannah BR	*Passerculus sandwichensis* BR
Skimmer, black	*Rynchops niger*	Woodpecker, red-headed	*Melanerpes erythrocephalus*
Sparrow, Henslow's	*Ammodramus henslowii*		
Sparrow, vesper BR	*Pooecetes gramineus* BR		
Tern, least	*Sternula antillarum*		

Tern, roseate**	*Sterna dougallii***	
Warbler, golden-winged BR	*Vermivora chrysoptera* BR	
Wren, sedge	*Cistothorus platensis*	
**Federally endangered or threatened		
BR - Breeding population only; NB - non-breeding population only		

REPTILES			
Endangered		**Threatened**	
Rattlesnake, timber	*Crotalus h. horridus*	Snake, northern pine	*Pituophis m. melanoleucus*
Snake, corn	*Elaphe g. guttata*	Turtle, Atlantic green**	*Chelonia mydas***
Snake, queen	*Regina septemvittata*	Turtle, wood	*Clemmys insculpta*
Turtle, bog**	*Clemmys muhlenbergii***		
Atlantic hawksbill**	*Eretmochelys imbricata***		
Atlantic leatherback**	*Dermochelys coriacea***		
Atlantic loggerhead**	*Caretta caretta***		
Atlantic Ridley**	*Lepidochelys kempi***		
**Federally endangered or threatened			

AMPHIBIANS			
Endangered		**Threatened**	
Salamander, blue-spotted	*Ambystoma laterale*	Salamander, eastern mud	*Pseudotriton montanus*
Salamander, eastern tiger	*Ambystoma tigrinum*	Salamander, long-tailed	*Eurycea longicauda*
Treefrog, southern gray	*Hyla chrysocelis*	Treefrog, pine barrens	*Hyla andersonii*

INVERTEBRATES			
Endangered		**Threatened**	
Beetle, American burying**	*Nicrophorus americanus***	Baskettail, robust(dragonfly)	*Epitheca spinosa*
Beetle, northeastern beach tiger**	*Cincindela d. dorsalis***	Clubtail, banner (dragonfly)	*Gomphus apomyius*
Copper, bronze	*Lycaena hyllus*	Clubtail, harpoon (dragonfly)	*Gomphus descriptus*
Floater, brook (mussel)	*Alasmidonta varicosa*	Elfin, frosted (butterfly)	*Callophrys irus*
Floater, green (mussel)	*Lasmigona subviridis*	Emerald, Kennedy's (dragonfly)	*Somatochlora kennedyi*
Petaltail, gray (dragonfly)	*Tachopteryx thoreyi*	Floater, triangle (mussel)	*Alasmidonta undulata*

Satyr, Mitchell's (butterfly)**	*Neonympha m. mitchellii***	Fritillary, silver-bordered (butterfly)	*Bolaria selene myrina*
Skipper, arogos (butterfly)	*Atrytone arogos arogos*	Jewelwing, superb (dragonfly)	*Calopteryx amata*
Skipper, Appalachian grizzled (butterfly)	*Pyrgus wyandot*	Lampmussel, eastern (mussel)	*Lampsilis radiata*
Wedgemussel, dwarf**	*Alasmidonta heterodon***	Lampmussel, yellow (mussel)	*Lampsilis cariosa*
		Mucket, tidewater (mussel)	*Leptodea ochracea*
		Pondmussel, eastern (mussel)	*Ligumia nasuta*
		Snaketail, brook, (dragonfly)	*Ophiogomphus asperses*
		White, checkered (butterfly)	*Pontia protodice*
**Federally endangered or threatened			

MAMMALS	
Endangered	
Bat, Indiana**	*Myotis sodalis***
Bobcat	*Lynx rufus*
Whale, North Atlantic right**	*Eubalaena glacialis***
Whale, blue**	*Balaenoptera musculus***
Whale, fin**	*Balaenoptera physalus***
Whale, humpback**	*Megaptera novaeangliae***
Whale, sei**	*Balaenoptera borealis***
Whale,sperm**	*Physeter macrocephalus***
Woodrat, Allegheny	*Neotoma floridana magister*
**Federally Endangered	

FISH	
Endangered	
Sturgeon, Atlantic**	*Acipenser oxyrinchus oxyrinchus***
Sturgeon, shortnose**	*Acipenser brevirostrum***
**Federally Endangered	

Effect of *bifenthrin*
on endangered species:

The use of *bifenthrin* is not likely to have any significant negative effects on the above organisms since previous EPA studies have found few negative effects.

From: https://www.epa.gov/endangered-species/bulletins-live-two-view-bulletins

Site searched for bifenthrin effects on endangered species in NJ during July and found the following results:

"Currently, no pesticide use limitations exist within the printed map view for the month and year you selected, beyond the instructions specified on the pesticide label. Follow the use instructions on your label."

COORDINATION WITH OTHER AFFECTED FEDERAL, STATE, AND LOCAL AGENCIES (166.20(a)(8))

The New Jersey Department of Agriculture has provided a copy of this request to the State office of the United States Fish & Wildlife Service; the New Jersey Department of Fish & Wildlife and the New Jersey Department of Environmental Protection, Pesticide Control Program. Any comments provided to the Department of Agriculture will be forwarded to the EPA as they are received.

NOTIFICATON OF REGISTRANT(166.20(a)(9)

The manufacturer of bifenthrin (FMC – Brigade, UPI – Bifenture) is aware of and supportive of this request. Letters of support for this Section 18 have been received and are attached to this request. Once the Section 18 for this use is approved, Registrant's will be contacted to provide Section 18 labels for their products.

ENFORCEMENT PROGRAM (166.20(a)(10)

The New Jersey Department of Environmental Protection has been granted authority to administer and carry out legislative intent and enforcement measures related to the regulation and use of pesticides in the state. The New Jersey Department of Environmental Protection Pesticide Control Program carries out an efficient and effective pesticide program, complying with the intent of FIFRA regulations. The NJDEP would plan to conduct routine pesticide use investigations pertaining to the use of pesticides under section 18 emergency exemption registrations and respond to all complaints of misuse. The New Jersey Department of Environmental Protection will take appropriate steps to ensure that the conditions of this exemption are met.

Specific exemptions may be granted by the Environmental Protection Agency pursuant to FIFRA Section 18 and 40 CFR Part 166. The Department has the authority and responsibility to enforce any special requirements that EPA might see fit to impose on an approved Section 18 label. The proposed use o *bifenthrin (Brigade and Bifenture)* under this Emergency exemption request will be monitored by the New Jersey Department of Environmental Protection.

Education is a critical component of any enforcement program. The Department relies strongly on the educational outreach provided by the Rutgers University / New Jersey Agricultural Experiment Station's Cooperative Extension Service. The Extension Service will inform Extension Agents of the Emergency exemption program requirements and the guidelines which growers and applicators must follow when using *bifenthrin (Brigade and Bifenture)*. Extension personnel will be available to answer questions which might arise regarding procedures of application.

ECONOMIC DATA FROM PAST FIVE YEARS (166.20(b)(4)(i)

Year	Unit	State	Commodity	Data Item	Value
2016	YR	NJ	APPLES	APPLES, - $	36,350,000
2016	YR	NJ	PEACHES	PEACHES, - $	28,403,000
2015	YR	NJ	APPLES	APPLES, - $	36,318,000
2015	YR	NJ	PEACHES	PEACHES, - $	27,585,000
2014	YR	NJ	APPLES	APPLES, - $	30,492,000
2014	YR	NJ	PEACHES	PEACHES, - $	27,891,000
2013	YR	NJ	APPLES	APPLES, - $	12,844,000
2013	YR	NJ	PEACHES	PEACHES, - $	27,180,000
2012	YR	NJ	APPLES	APPLES, - $	28,540,000
2012	YR	NJ	PEACHES	PEACHES, - $	39,600,000

NASS QuickStats for NJ 2016

2016	2015	2014	Avg
$64,753,000.00	$63,903,000.00	$58,383,000.00	$62,346,333.33

The trend over the last 3 years for NJ tree fruit production is positive, in that values have increased since 2014. Production values are not yet available for the 2017 growing season, but grower prices were greater in 2017 than in 2016. Both survey data from the Rutgers Fruit IPM Program and research data during 2017 showed that BMSB damage was extremely variable from farm to farm and from variety to variety. In general, BMSB damage was heavier on later varieties, and extremely heavy on late season apples if not properly treated. On intensively treated farms, peach damage ranged from 1 to 4% and apple damage averaged 10.2%. On farms where insecticides were not used, damage averaged 50% with a maximum of 80% of fruit injured with over 50 feeding sites per fruit. It should be noted that during 2017 high BMSB populations went into the overwintering phase. Therefore, it is likely that higher than normal populations will emerge in the spring. Based on 2016 crop values, an average of 10% injured fruit results in a $3.6 million loss for NJ apple growers. A 4% loss results in a $1.14 million loss for NJ peach growers, and an overall 50% loss on tree fruit means a devastating $32 million loss.

ATTACHMENTS

LETTERS OF SUPPORT

FROM