

Article 1:

Result of selecting mother plants (ortets) for propagation of Nam Son mandarin in Hoa Binh province

Tran To Tam^{*}, Doan Thu Huong, Dinh The Long

Fruit and Vegetable Research Institute (FAVRI)

* E-mail: totam209@gmail.com

Abstract

Nam Son mandarin originates in Nam Son commune, Tan Lac district, Hoa Binh province. The citrus fruit owes many special properties: red succulent and tasty flesh, fruit weight from 100-200 g. The fruit yield of 8 - 10 years old mandarin trees reaches 60 kg/tree in average, with the price of 20,000 VND/kg, which enables the earnings of 1.2 million VND/year that is much higher than that of rice production. Specifically, due to its harvest falling on the new year holiday, the fruit price is high and it improves economic efficiency for farmers. However, cultivation of Nam Son Mandarin are mainly based on experience of local farmers, application of advanced cultural techniques is relatively poor, without any varietal selection and improvement, resulting in sharp drop in cultivation area, yield and production. Selection of individual mother plants (ortets) is a solution to maintain, conserve and develop the indigenous mandarin variety. The study selected 5 individual mother plants that were satisfied requirements of ortets, namely QNS01; QNS02; QNS03; QNS05; QNS08. These individuals have been recognized as individual ortets for propagation in accordance with Decision number 04/QD-SNN dated 25 January 2016 by the Department of Agriculture and Rural Development of Hoa Binh province.

Keywords: Nam Son Mandarin, genetic resource, mother plants (ortet), conserve, varietal improvement

Article 2:

Selection and development of Korean promising cabbage varieties in Northern Vietnam

Nguyen Xuan Diep^{*}, Ngo Thi Hanh

Fruit and Vegetable Research Institute (FAVRI)

* E-mail: diepvienrauqua@gmail.com

Abstract

Under the collaborative research program between the Vietnam Academy of Agricultural Sciences (VAAS) and the Korean Rural Development Administration (RDA), the Korean cabbage varieties were evaluated in the comparison with popular cabbage varieties grown in the specializing vegetable production area in Northern Vietnam. The trial results showed that Korean cabbage variety CT17 was adapted to ecological condition in Northern Vietnam. CT17 had high yield of 36-38 ton/ha, head weight of 1.6-1.7 kg with good quality (dry content at 7-8 %, thick leaves and crispy) and suitable for consumer.

Keywords: Korean cabbage variety, testing, selection, Winter crop season

Article 3:

Selection BoT1 rice variety with short growth duration, good quality and adaptable for Northern central region

Le Van Vinh^{*}, Tran Thi Tham, Vo Van Trung

Agricultural Science Institute of Northern Central Vietnam (ASINCV)

* E-mail: vinh0960@gmail.com

Abstract

BoT1 is an introduced rice variety which has hort growth duration from 116 to 123 days in Spring crop season and 95 - 99 days in Summer crop season in the North Central and Northern provinces. It has strong stem and plant height varied from 95 - 105 cm, good growth and tillering; long and thin seeds; brown seed coat color. BoT1 had high yield potential, average yield reached 6.5 - 7.4 tons/ha in Spring crop season and 5.7 - 7.1 tons/ha in Autumn crop season. It had soft, tasty and fragrant grain. This variety pretty cold tolerant, anti-logging, wide adaptative, midium infected by some major pests and diseases, suitable for late Spring and Summer crop season in Northern Central and Northern provinces of Vietnam.

Keywords: Rice variety BoT1, high yield, quality, growth duration

Article 4:

Selection of chili pepper (*Capsicum annum spp.*) varieties for alluvial soils along the river of Thanh Hoa province

Do Dang Thao^{1*}, Tran Cong Hanh²

¹ Thanh Hoa Rubber One Member Co., Ltd; ² Hong Duc University

* E-mail: thaothrc@gmail.com

Abstract

Four hybrid chili pepper varieties (Shiny Hot 307, F1 Upright Chilli VA.242, F1 Red Ruby 101, F1 AD 79) and a control variety (SSC 668) were evaluated on the trial field at Thieu Tân commune, Thieu Hoa district, Thanh Hoa province during Winter - Spring season of 2016 - 2017. The experiment was arranged in randomized complete block design with three replications. The result showed that the growth duration was significantly different among all varieties ranging from 137 - 150 days. The real yield of F1 Red Ruby 101 and F1 AD 79 was quite high (24.2 and 21.8 tons/ha, respectively) and higher than that of the control (18.6 tons/ha) and resistant to some pests and diseases. These two chili varieties had morphological characteristics such as fruit uniformity, dry weight, colour and quality meeting the market demand and preference. Two promising varieties (F1 Red Ruby 101 and F1 AD 79) are recommended to be tested in next seasons before releasing to production in Thanh Hoa.

Keywords: Chilly (*Capsicum annuum* spp.), yield, quality, alluvial soils, Thanh Hoa province

Article 5:

Selection and development of Korean welsh onion varieties in Northern Vietnam

Hoang Minh Chau*, Ngo Thi Hanh

Fruit and Vegetable Research Institute (FAVRI)

* E-mail: chautrangvrq@gmail.com

Abstract

Welsh onion is a short duration vegetable spices. It is easy to grow and have high nutrition and economic value, special is medicines. Currently, the studies on selection of Vietnam welsh onion are not interested. The welsh onion varieties are mainly local with low yield and many diseases. To introduce new varieties of Welsh onion with high yield, good quality and adaptable to the farming conditions of Vietnam, the Fruit and Vegetable Research Institute has conducted research on selection and evaluation of 6 Korean welsh onion varieties from 2011 to 2013. The welsh onion varieties were selected and tested over the Autumn and Winter season in Hanoi, Quang Ninh, Hoa Binh provinces. The results identified the best Huk keum jang welsh onion variety, with plant weight of 90 - 150 g/plant. The yield was more than 50 tons/ha and resistance to pest and disease damage in open field conditions.

Keywords: Korean weseh onion, spring onion, testing

Article 6:

Selection and development of Korean perilla varieties in Northern Vietnam

Hoang Minh Chau^{*}, Ngo Thi Hanh

Fruit and Vegetable Research Institute (FAVRI)

^{*} E-mail: chautrangvrq@gmail.com

Abstract

Green perilla is a short duration vegetable spices. It is easy to grow and has high nutrition, economic and, especially medicinal value. Currently, the studies on selection of Vietnam green perilla are not interested. The green perilla varieties are mainly the local with low yield and strong smell. To introduce new varieties of green perilla with high yield, good quality and adaptable to the farming conditions in Vietnam, the Fruit and Vegetable Research Institute conducted research on selection and evaluation of 5 Korean green perilla varieties from 2012 to 2014. The green perilla varieties were selected and tested in the Spring and Summer season in Hanoi province. Deanong green perilla variety was identified the best one. The yield was more than 10 tons/ha and this variety was resistant to pest and disease damage in open field conditions.

Keywords: Green perilla, Korean perilla, Sesame leaves. perilla selection

Article 7:

Evaluation of agro-morphological traits and quality of newly introduced melon varieties (*Cucumis melo*L.) for coastal areas of Thanh Hoa province

Le Huy Quynh^{1*}, Tran Cong Hanh²

¹ The Provincial Department of Agro-Forestry-Fisheries Quality Assurance of Thanh Hoa

² Hong Duc University

^{*} E-mail: lequynhqlcl@gmail.com

Abstract

Five melon varieties introduced from Korea and Taiwan were evaluated during Spring - Summer season of 2017 in Quang Xuong district, Thanh Hoa province. The result indicated that all 5 melon varieties grew and developed well under local climate and cultivation conditions,

especially two varieties named Super 007 and VA68 with high yield (more than 20 tons/ha) in comparison to the control and other ones. The morphological characteristics of fruits such as fruit diameter, weight, colour of fruit skin and quality of most varieties were met the consumers' demand and preference. These studied melon varieties were medium resistant to pests and diseases and their average yield were quite high and varied from 13.54 t/ha to 21.68 t/ha. Two promising varieties (Super 007 and VA68) with high economic efficiency (214 - 293 mill. VND/ha) were recommended to be widely cultivated in coastal districts of Thanh Hoa province.

Keywords: Melon, introduced variety, quality, yield, Coastal area, Thanh Hoa province

Article 8:

Study on growth and development characteristics of cherry blossoms (*Prunus* var. *Edohigan Sakura*) and technical measures for their cultivation

Pham Thi Ha^{1*}, Dang Van Dong²

¹ Dien Bien Technical Economic College; ² Fruit and Vegetable Research Institute (FAVRI)

* E-mail: ptha1982@gmail.com.

Abstract

This study focuses on the growth and development characteristics and cultivating techniques of three lines of Japanese cherry blossoms (*Prunus* var. *Edohigan Sakura*). The results showed that these three lines had some common features such as good vitality, egg-shaped green leaf blade, and small red fruit. Besides, they all began to bloom at their 3 - 5 years old, which was foreseen by abscission. AD1 and AD2 lines both bloomed from the end of December to the beginning of January, while AD3 bloomed much sooner from the beginning of December. The three lines differed in their flower petal colour: strong pink for AD1, light pink at the margin and stronger pink at the base for AD2, very light pink for AD3. In terms of nutrition supplement, slowly - released fertilizer tablets not only increased the speed and quality of bud forming, but also prolonged the flower duration.

Keywords: Cherry blossom (*Edohigan Sakura*), growth, development

Article 9:

Analysis of phylogenetic relationship of *Dendrobium* based ITS sequences

Nguyen Nhu Hoa^{1*}, Tran Hoang Dung²,
Duong Hoa Xo³, Huynh Huu Duc³

¹ Ho Chi Minh City University of Pedagogy; ² Nguyen Tat Thanh University

³ Biotechnology Center of Ho Chi Minh city

* E-mail: hoann@hcmup.edu.vn

Abstract

Analysis of DNA sequence data is the basis for identifying and preserving *Dendrobium* species and selecting potential hybrid combinations to create new valuable orchids. In this study, 23 *Dendrobium orchids* were analyzed based on DNA sequences of the nuclear ribosomal internal transcribed spacer (ITS) region. The ITS region consisted of a part of the 18S region, the entire ITS1, 5.8S, ITS2 and part of the 28S region, and the length of 659 to 706 nucleotides. Based on phylogenetic tree, 12 samples of *Dendrobium* collected in the south and 11 samples of *Dendrobium* introduced from Thailand were separated into two groups. Some Vietnamese *Dendrobium* have been identified by the morphology that coincides with the ITS region identification. However, in some regions ITS sequence samples did not show a clear consensus between the identification and morphology marker.

Keywords: *Dendrobium*, DNA barcode, ITS region, phylogenetic tree

Article 10:

Morphological and anatomical comparison of wild and *in vitro* *Rhynchosyilis gigantea*

Banchar Keomek¹, Dang Van Dong^{1, 2},
Phung Thi Thu Ha¹, Nguyen Xuan Canh^{3*}

¹ Faculty of Agronomy, Vietnam National University of Agriculture

² Fruit and Vegetable Research Institute (FAVRI)

³ Faculty of Biotechnology, Vietnam National University of Agriculture

* E-mail: nxcanh@vnu.edu.com

Abstract

Rhynchostylis gigantea is one of the most popular and valuable orchid species of Vietnam. Both wild *R. gigantea* and *in vitro R. gigantea* are popular; however, many growers cannot distinguish between them because of a lack of description. This study focuses on morphological and anatomical characters in order to distinguish wild *R. gigantea* from 1, 2, 3 – year – old *in vitro R. gigantea*. The results indicated that the growth parameters of wild *R. gigantea* were better than that of 2 – year – old *in vitro* plants and lower that of 3 – year – old *in vitro* ones. The leaf angle of wild plants was larger than that of *in vitro* plants. In addition, these wild *R. gigantea* had a sparser of flowers in inflorescence, shorter pedicle, smaller flower diameter, stronger flower scent than that of *in vitro* orchids. Tip of sepal and petal of *in vitro* plants are rounder and thicker than that of wild plants. Data on anatomical and morphological characters indicated that adaptation of *in vitro R. gigantea* to Gia Lam, Hanoi's climate were better than that of wild orchids.

Keywords: Anatomy, Flower structure, Morphology, *Rhynchostylis gigantean*

Article 11:

Establishment of protocol for *in vitro* cormel production of Gladiolus hybrid lines

Nguyen Thi Hong Nhung^{*}, Bui Thi Hong, Dang Van Dong

Fruit and Vegetable Research Institute (FAVRI)

*E-mail: [Nhunganmorecnsh510280@gmail.com](mailto:Nhungmorecnsh510280@gmail.com)

Abstract

Gladiolus is sexual and asexual reproductive plant. *In vitro* propagation contributes to make a large number of gladiolus cormels, uniform and free - disease. The study was carried out on J11 hybrids; experiment design was completely randomized with 3 replications. Explants were well sterilized with NaDCC 1% for 15 minutes with a high regeneration rate of 76.7%. Medium combination composed of 2 mg / l BAP + 0,25 mg/ l α -NAA and was suitable for multiple shoots. 80% of explants produced new shoots; the number of shoots reached 4.8 shoots per explant. The single shoots formed cormels with high rate on medium supplemented with 50 g / l sucrose + 1 mg / l IBA; 16 hours lighting/8 hours darkening. The average bulb weight was 0.96 g, bulb diameter was 0.93 cm.

Keywords: Line, new variety, gladiolus, *in vitro* propagation, cormel production

Article 12:

Effect of α -NAA and growing seasons on branches cuttings used for rootstock of some citrus varieties

Nguyen Thi Thuy*, Nguyen Thi Ngoc Anh,
Cao Van Chi, Pham Ngoc Lin

Center Citrus for Research and Development of, Fruit and Vegetable Research Institute (FAVRI)

* E-mail: trangphongle@gmail.com

Abstract

The study on effect of α -NAA and growing seasons on branches cuttings used for rootstock of some citrus varieties was conducted at the Citrus Research and Development Center. The materials included four types of rootstocks namely Poncirus trifoliata, Citrang troyer, Citrang carizo and Citrumelo; and α -NAA solution at the concentration of 1000 ppm, 1500 ppm, 2000 ppm and 2500 ppm. The results revealed that four types of rootstocks showed the highest rates of survival, rooting and sprouting in spring season and treated by α -NAA 2000 ppm solution. Survival rate of cuttings ranged from 56.76% to 85.27%; the duration from cutting to planting lasted from 104.7 days to 118 days.

Keywords: Rootstocks, α -NAA solution, season

Article 13:

Factors affecting Yen Tu yellow apricot multiplication by grafting in Hanoi

Bui Huu Chung*, Dang Van Dong

Fruit and Vegetable Research Institute (FAVRI)

* E-mail: buihuuchung@yahoo.com

Abstract

Yen Tu yellow apricot has been grown for long time and it has been confirmed to be adaptable to Yen Tu mountain foot by scientists. In recent years, Yen Tu yellow apricot has been tested in Hanoi by the Research Institute of Vegetables and Fruits and it has been well grown. However, in order to develop the precious Yen Tu yellow apricot, it is necessary to multiply for providing commercial trees. There are many ways of propagation, among which the grafting method is our choice in this study. The study identified some factors affecting the reproduction of Yen Tu yellow apricot by grafting method including: with 12 months old yellow apricot trees for grafting

was the best one; Grow - more 18DD preparation should be used for irrigation during the nursuring care, and the most suitable time for grafting of Yen Tu yellow apricot in Hanoi was in March.

Keywords: Yen Tu yellow apricot, test, multiplication, grafting

Article 14:

Study on technical measures for *Rhynchostylis gigantea* in Dien Bien province

Quang Thi Duong^{1*}, Dang Van Dong²

¹ Dien Bien Technical Economic College; ² Fruit and Vegetable Research Institute (FAVRI)

* E-mail: quangduong301286@gmail.com

Abstract

Rhynchostylis gigantea (Lindl.) Ridl, found in Dien Bien, a northern mountainous province of Vietnam, is one of the valuable indigenous orchids, standing out with its beautiful colour, attractive fragrance and long-lasting duration of flowers. However, *R. gigantea* has not been fully studied, especially the growing technique to commercialize this potential flower. Therefore, the research was conducted to develop effective planting method for *R. gigantea*. The results showed that the growing season should begin in the middle of June; the most suitable planting medium was fresh longan wood (*D. longan*) (cylindrical, 40cm x 20cm). The most effective growth stimulant was Atonik 1.8SL 10ml, which led to 85.79-cm root length, 9.56 leaves, 25.1-cm leaf blade length, 23.97-cm flower stem, and 25.03 flowers per stem. Besides, the best fertilizer was Dau Trau 501 (30:15:10), which led to significant improvement in growing speed and flower quality of *R. gigantea* in comparison to the control.

Keywords: *Rhynchostylis gigantea*, indigenous orchids, fresh longan wood, growing season

Article 15:

Study of cleaning anthocyanin from purple sweet potatoes variety by column chromatography

Nguyen Duc Hanh^{*}, Hoang Thi Le Hang,
Nguyen Minh Chau, Nguyen Hoang Viet

Fruit and Vegetable Research Institute (FAVRI)

* E-mail: hanhbqcb@yahoo.com.vn

Abstract

In this article, we have determined the technological parameters for refination of anthocyanins from purple sweet potatoes that planting quite widening in Vietnam. Absorbent is an effective way to cleaning up biological components in a compound. Different absorbents were reported to use very popular in extracting anthocyanins from crude oil, mulberry and blueberry fruits. The results of anthocyanin refination in puprple sweet potatoes showed that the purity of anthocyanin was relatively high when anthocyanin was refined by column chromatography method with ethanol concentration of 60% to carry out the elution of the anthocyanins obtained with the XAD7 adsorbent in 4 minutes, at 25°C.

Keywords: Anthocyanin, refining, purple-fleshed sweet potato, Column chromatography

Article 16:

Changes in production and trade of safe vegetables Lao Cai province

Ngo Thu Hang^{*}, Nguyen Thi Sau, Nguyen Thi Tan Loc

Fruit and Vegetable Research Institute (FAVRI)

* E-mail: nt.hang04@gmail.com

Abstract

The result of implementing the project “*Towards more profitable and sustainable vegetable farming systems in North-western Vietnam*” funded by the Australian Center for International Agricultural Research (ACIAR) from 2012 until now confirmed the potential and ability of safe vegetables (SV) in general, indigenous vegetables production in particular in Lao Cai province. The livelihood of producers, traders and consumers of safe vegetables were improved. The assessment results of production and distribution was recorded by in-depth interviews and meetings of the actors. The intensity of investment in the production and distribution of safe vegetables in Lao Cai increased along with equipping modern facilities to ensure the best quality for consumers. Being as the last actor in the chain, the consumers play an important role in determining the development of products as they are directed to maximize the benefits when having safe products with higher quality and greater satisfaction.

Keywords: Lao Cai vegetables, improving, producers, traders, consumers

Article 17:

Results of testing BT6 rice variety in Northern central region

Le Van Vinh*, Tran Thi Tham, Vo Van Trung

Agricultural Science Institute of Northern Central Vietnam (ASINCV)

* E-mail: vinh0960@gmail.com

Abstract

The short duration rice variety BT6 was created in 2006 by selecting from the combination of BT7 and TBR1 rice varieties. It was be tested in Nghe An and Thua Thien Hue provinces from 2010 and then was VCU and DUS tested by the National Seed Testing Center. Results of testing showed that BT6 rice varieties had short duration (120 - 130 days in Spring crop and 100 - 105 days in Summer - Autumn crop season), high yield (6.5 - 7.0 tons/ha in Spring), good quality, resistance to pests and diseases. It is suitable for development in Northern central region.

Keywords: BT6 rice variety, short duration, high yield, quality, testing

Article 18:

Identification of *Colletotrichum* causing anthracnose of chilli in the Red River Delta

Nguyen Duy Hung^{1*}, Ha Viet Cuong²,
Hoang Chung Lam¹, Nguyen Duc Huy²

¹ Fruit and Vegetable Research Institute (FAVRI)

² Vietnam National University of Agriculture

* E-mail: duyhungfavri@gmail.com

Abstract

This study presents the identification of *Colletotrichum* infecting chilli in the Red River Delta based on the morphological and molecular characterization. The sequence analyses of Internal Transcribed Spacer (ITS) and ApMat regions identified at least 5 species, including *C. truncatum*, *C. fructicola*, *C. gloeosporioides (sensu stricto)*, *C. aeshynomenes* and *C. siamense*, from chilli samples collected in the Red River Denta, of which, the 4 latter species are recognized in Vietnam for the first time.

Keywords: Anthracnose, chilli, *Colletotrichum*, Internal Transcribed Spacer, Red River Delta

Article 19:

Isolation, classification and identification of pathogenic bacteria causing disease on Lingzhi (*Ganoderma lucidum*)

Nguyen Xuan Canh^{*}, Tran Dong Anh, Tran Thi Huong, Le Huong Giang

Faculty of Biotechnology, Vietnam National University of Agriculture

* E-mail: nxcanh@vnua.edu.com

Abstract

In this study, we have conducted to isolate and identify the bacteria strains that were capable of causing disease on the Lingzhi mushrooms. Initially, 13 bacteria strains from infected Lingzhi mushroom were isolated. Through artificial infection or re-infection directly on the cap of Lingzhi mushrooms, LC10, LC11 strains were identified as the cause of Lingzhi mushroom's disease. Both of LC10 and LC11 were gram-positive, rod-shaped bacteria, producing endospore, capable of releasing catalase, converting glucose to produce acid, and the suitable temperature for growth and development was 25 - 35°C. They had the ability to releasing extracellular enzymes, chitinase and cellulase, with high activity. The results of 16S rRNA sequence analysis showed that LC10 strain had a similarity of 99% with *Bacillus flexus*. LC10 strain was identified to belong to *Bacillus flexus* species based on morphology, biochemical characteristics and molecular biological analysis.

Keywords: *Ganoderma lucidum*, 16S rARN, *Bacillus flexus*

Article 20:

Effect of the replacement of rubber sawdust by corn core on culturing mushroom

Pycnoporus sanguineus

Tran Duc Tuong^{1*}, Duong Xuan Chu², Bui Thi Minh Dieu³

¹ Dong Thap University; ² Can Tho University of Medicine and Pharmacy

³ Can Tho University

* E-mail: tdtuongdthu@gmail.com

Abstract

The studied mushroom was identified as *Pycnoporus sanguineus*. At the first phase of culture, mycelium had the fastest speed development (1.78 cm/day) in the PDA medium supplemented with 10% coconut water. In the second phase, steamed rice grain was the optimal substrate for mycelial growth (0.800 cm/day). For the third phase, cassava stalks was the best medium for mycelial spreading (0.544 cm/day). The formula of compost including corn core (50%) and rubber sawdust (50%) without nutritional supplement was considered as the most suitable substrate for the growth of mushroom *Pycnoporus sanguineus* to give the high yield (103 g/bag).

Keywords: Corn core, *Pycnoporus sanguineus*, rubber sawdust, substrate

Article 21:

Biodiversity of insects and natural enemies in paddy ecosystems in some Northern provinces of Vietnam

Cu Thi Thanh Phuc^{1*}, Dang Thi Phuong Lan¹, Nguyen Huy Manh²,
Nguyen Thi Hang Nga¹, Lai Thi Thu Hang¹, Dinh Xuan Tung¹,
Nguyen Thi Thao¹, Pham Hong Nhung¹, Pham Thi Tam¹,
Vu Van Can¹, Le Thanh Tung¹

¹ Institute for Agricultural Environment; ² Plant Protection Department, MARD

* E-mail: cuthanhphuc@gmail.com

Abstract

Biodiversity plays an important role in the ecosystems, but studies on the biodiversity in paddy ecosystems in Northern provinces are still very limited. This paper provides the results of a survey on biodiversity in paddy ecosystems in Northern provinces in 2017. Obtained results showed that there were 26 species in Luong Son district (Hoa Binh province), 24 species in Thach That district (Hanoi city) and 24 species in Giao Thuy district (Nam Dinh province). The extent of biodiversity in the paddy ecosystems was influenced by the intensive farming of each region, not depended on the type of field foot being high or low and the biodiversity extent reduced when the intensive farming increased. Highly intensive area had high insect rate and low rate of natural enemies in the total number of species presented in the field. In contrast, lowly intensive area had low insect rate and high rate of natural enemies in the total number of species encountered in the field.

Keywords: Paddy ecosystem, biodiversity, insect, natural enemies

Article 22:

Study on herbicide-using technique to treating *Merremia eberhardtii* in Danang

Dang Thi Phuong Lan^{1*}, Cu Thi Thanh Phuc¹,
Nguyen Huy Manh², Nguyen Thi Thao¹, Le Thanh Tung¹,
Dinh Xuan Tung¹, Nguyen Thi Hang Nga¹, Pham Thi Tam¹

¹Institute of Agricultural Environment; ² Plant Protection Department

* E-mail: orchidiae@gmail.com

Abstract

Merremia eberhardtii is an invasive alien species in many countries in the world, including in Vietnam. Studies in the world showed that this species has caused serious damages in the areas where they are invading such as biodiversity loss, ecosystem disturbance, economic damage, and potentially caused forest fire, therefore, they should be managed, prevented and treated. This paper presents the results of research on techniques using plant protection products to prevent the spread of *Merremia eberhardtii* in Danang. Achieved results showed that the technique of putting herbicide into the trunk via punched hole and technique of cutting the tree, putting herbicide to kill the remain part of the tree via punched hole had treatment efficiency of 100%. For technique of putting herbicide into the trunk via punched hole, the suitable amounts of Roundup 480SC were 100 ml/tree, 150 ml/tree, 300 ml/tree and 400 ml/tree for trees with diameter of < 5 cm, 5 – 10 cm, 10-20 cm and > 20 cm; the used amount of Ally 20DF was 6 g/tree for trees with diameter of < 5cm, 15 g/tree for trees with diameter of 5 - 10 cm, 22.5 g/tree for trees with diameter of 10 - 20 cm and 30 g/tree for trees with diameter of > 20 cm. For technique of cutting the tree, putting herbicide to kill the remain part of the tree via punched hole, i) the suitable amount of Roundup 480SC was 30 ml/tree for trees with diameter of < 5 cm; 60 ml/tree for trees with diameter of 5 - 10 cm; 90 ml/tree for trees with diameter of 10 - 20 cm and 150 ml/tree for trees with diameter of > 20 cm; ii) the amount of Ally 20DF was 3 g/tree with diameter of <5 cm; 6 g/tree with diameter of 5 - 10 cm; 9 g/tree with 10 – 20 cm diameter and 12 g/tree with diameter of > 20 cm.

Keywords: *Merremia eberhardtii*, Metsulfuron Methyl, Glyphosate

Article 23:

Evaluation of wastewater quality in traditional lacquer production villages

Pham Thi Thanh Huyen, Dao Van Thong^{*}, Bui Thi Lan Huong,
Vu Pham Thai, Le Thi Thanh Thuy, Tran Thi Huong,
Do Thi Hai, Nguyen Anh Thanh, Le Thi Huong,
Le Hong Son, Truong Thanh Ka

Institute of Agricultural Environment (IAE)

* E-mail: thongvasi@gmail

Abstract

The study aimed to determine the level of wastewater pollution in lacquer production in Ha Thai village, Duyen Ha commune, Thuong Tin district, Hanoi city. The content of turbidity and suspended solids (TSS), chemical oxygen demand (COD) and Biological Oxygen Demand after 5 days (BOD₅) were higher than that of QCVN 40: 2011/BTNMT standard at 4 sampling sites. The content of TSS in wastewater was 3.4-4.0 times; the content of COD was 5.12 - 6.4 times; the content of BOD₅ was 1.88 - 2.62 times higher than that of industrial wastewater standard, respectively. The content of heavy metals in water samples in trade villages was not detected and reached the industrial wastewater standards (QCVN 40: 2011/BTNMT). However, the content of As in the effluent at the deposition stage and the content of Pb in the pond water were higher than that of the surface water standard.

Keywords: Craft village, environment, heavy metal, COD, BOD

Article 24:

Effects of salinity on growth performance and survival rate of giant fresh water prawn (*Macrobrachium rosenbergii*) in nursing recirculation system with and without biofloc application

Duong Thien Kieu^{1*}, Tran Ngoc Hai², Cao My An², Chau Tai Tao²

¹ Dong Thap Community College

² College of Aquaculture and Fisheries, Can Tho University

* E-mail: dtkieu.dtcc@gmail.com

Abstract

This study aims to determine appropriate salinities for the better growth performance and survival rate of giant freshwater prawn in nursing recirculation system with and without biofloc application. The experiment included six treatments with salinities of 0‰, 5‰, 10‰ and with and without biofloc application. Post-larvae (0.006 g) were stocked in experimental tanks (500 L) at stocking densities of 1000 individual/m³. Rice flour was added to create biofloc at C/N = 15. Results showed that after 30 days of nursing, application of biofloc significantly improved prawn specific growth rate (SGR; 9.65 ± 0.46 %/day) and survival rate (SR; $80.0 \pm 17.1\%$) compared to without biofloc application (SGR; 8.89 ± 0.33 %/day and SR; $69.7 \pm 11.1\%$). Nursing prawn at salinity of 0‰, SGR (8.86 ± 0.41 %/day) and SR ($57.2 \pm 1.95\%$) were significantly lower than those of salinities of 5 ‰ and 10 ‰. In short, nursing post-larvae of giant freshwater prawn at salinity of 5 ‰ in combination with biofloc application presented the highest specific growth rate ($10.1 \pm 0.09\%$) and survival rate ($92.1 \pm 6.21\%$).

Keywords: Giant freshwater prawns, biofloc, stocking density, salinity