Chemical Control (C43-C50)

C-43. Development of a new formulation system for sustainable slow releasing of phosphorous acid in soils to control of Phytophthora diseases. Hae-Jun Park[1], Sung Ho Kim[1], and Hyeong-Jin Jee[2]. [1]Biodreams Co. Ltd., Daejeon 305-333, [2]Plant Pathology Div., National Institute of Agricultural Science and Technology, Suwon 441-707, Korea.

Phosphorous acid that effectively controls various Oomycetes diseases is the unique phloem-tanslocated fungicide moves upward and downward through the xylem and phloem in plants. The chemical is widely applied for trunk injection, soil drenching, foliar spray, or direct supplement into nutrient solution in hydroponics. However, soil drenching and foliar spray may not be as effective as trunk injection or direct supplement because of run-off, leaching, and inactivation in soils. Consequently, sustainable forms of the chemical releasing slowly in root zone is ideal to be up-taken by plants against Oomycetes diseases. We developed a new system of phosphorous acid formulation using a carrier coated with polysaccharides. The product consistently released adequate amount of phosphorous acid up to 4 weeks in rhizosphere soils. Soil drenching of phosphorous acid 1000 ppm and metalaxyl 150 ppm did not last its control effect for 4 weeks, however, direct application of the product around basal stem of pepper resulted excellent control effect against Phytophthora blight over 4 weeks. The product 4 g per plant was optimum to control the disease and 8 g did not induce phytotoxicity. Based on results, it seemed that one or two applications of the formulation during a cropping season may satisfy to control Phytophthora diseases on various crops.

C-44. A method for producing the sustained-releasing agricultural chemicals containing phosphoruos acid to control phytophthora blight. Hae-Jun Park[1], Sung Ho Kim[1], Hwa Jung Kim[1], Dong Woo Chang[2], Youn Seok Oh and Hong Gi Kim[3]. [1]Biodreams co. ltd., Daejeon 305-333, [2]Youngil chemical co. ltd., Seoul 135-784. [3]College of Agriculture, Chungnam Univ., Daejeon 305-764

The present study was conducted to develop a method for producing sustained-releasing agricultural chemicals containing effective components. A product produced by the method can control the period releasing the effective components and reduce the harmful damages from the agricultural chemicals. In the presentation, the phosphorous acid salt is adopted as an effective component of the sustained-releasing agricultural chemicals. To prepare sustained-releasing agricultural chemicals, a carrier was coated with polysaccharides derived from microorganism and containing the effective component. In detail, potassium hydroxide and curdlan were added to 200 ml of distilled water, mixed by stirring and dissolved sufficiently. Phosphorous acid was then; added and mixed completely so as to make a curdlan solution in a colloid form, and followed by 1 kg zeolite was added, mixed homogeneously and immersed in a humid condition. The resultant was dried with a hot air and curdlan containing the phosphorous acid was coated onto the zeolite. The experiment was performed on hot pepper plants inoculated *Phytophthora capsic*, artificially. The phosphorous acid of the agricultural chemicals absorbed onto a carrier was released sustainedly. The effect of

treatment lasted about 30 days, and the concentration of the phosphorous acid was enough to have an effect.

C-45. Contribution value of individual fungicides constituting a spray program in the control of apple fruit diseases. R. H. CHO, H. J. Lee, J. N, Kim, and J. Y. Uhm. Agricultural Biology. Kyungpook National University, Daegu 702-701, Korea.

Control of white rot and bitter rot of apple has almost solely been relied on calendar-based spraying, at 10- to 15-day interval, from petal fall to late August. To improve the spray program, we determine the effects of individual fungicides which are constituents of the program on the control of the two fruit diseases in 2000 and 2001. Seven blocks, equivalent to the number of spray times during the possible infection period of both diseases, were sprayed with fungicides in the order of propineb, folpet, dithianon, azoxystrobin, iminoctadine-triacetate, tebuconazole and samzinwang (combined formula of iminoctadine-triacetate and difenoconazole) at 15-day intervals from late May. At each spray time, the relevant fungicide was omitted in each block. The contribution value of each fungicide to disease control was assessed by comparing the disease incidence in each relevant fungicide-omitted block with that of the completely sprayed block. The contribution values of the fungicides were quite variable. In some case, lower disease incidence was detected in the fungicide-omitted block than that of complete spray. Applying this method, the control efficacy of specific fungicides against these diseases at a given application time was properly assessed by adopting them in a spray program, and the most suitable application time for each fungicide could be determined.

C-46. Studies of the epidemiology and control of pear scab. Young-Seob Park, Kyung-Hy Hong, and Koung-Sug Han. Naju Pear Research Institute, NHRI, RDA

Present work was carried out to survey seasonal development of pear scab caused by *Venturia nashicola*, and to find out spraying time of the fungicides for 5 years throughout 1997 to 2001. Conidia of the fungus were firstly detected early in May. Foremost symptoms appeared on young fruits in June 21, 1999. Fungicides sprayings of two times at white bud and petal-fall stages controlled the scab by 86.5%. Field application of pyroligneous liquor mixed with a third of amount recommended for control of the scab was relatively effective, but not effective with pyroligneous liquor alone. Protective fungicide was effective in spraying 4 days before inoculation of the fungus, and curative fungicide was effective in spraying within 3 days after infection. Resistances of the fungus to defenoconazole, bitertanol, and thiophanate-methyl were similar in three locations, Naju, Ulsan, and Sangju.

C-47. Control of sweet potato fusarium wilt with benomyl and hardening of vine cuttings. Yong-Hwan Lee[1], Kwang-Hong Cha[1], Sug-Ju Ko[1], In-Jin Park[1] and Yeong-Chul Kim[2]. [1]Jeonnam Agricultural Research and Extension Services, Naju 520-715, Korea, [2]Applied Plant Science Division and Institute of Biotechnology,

Chonnam National University, Kwangju, 500-757, Korea

To develop the control methods of sweet potato Fusarium wilt ((i)Fuasrium oxysporum(/i) f. sp. (i)batatas(/i)), dipping vine cuttings in benomyl solution for an hour before transplanting, hardening of vine cuttings, and combination of these methods were conducted. When vine cuttings were hardened for 2 days and dipped in benomyl solution for an hour before transplanting, diseased plant was just 7.2%. When dipping of vine in benomyl solution and hardening of vine cutting were done, diseased plants were 11.5% and 65.7%, respectively, while that of not treated was 74.7%. In case of hardening of vine cuttings, callus was formed in end of vine cuttings. Wilt disease suppressed effectively when hardening of vine cutting was done two or three days before transplanting. It was thought that pathogen could not invade to inner space of stem because of this barrier.

C-48. Effect of chemical fungicide mixtures against leaf blast and brown spot on rice. Hee Jun Kwon and In Kee Lee. Agricultural Technology Research Institute, Dongbu Hannong Chemical Co. Ltd., Hwaseung 445-960, Korea

Rice brown spot, caused by *Cochliobolus miyabeanus,* currently occurs and be severely increased by reducing the nitrogen fertilizers to prevent rice blast and to improve rice grain quality. But there are no foliar applied fungicides registered on rice brown spot in Korea as yet. To develop chemical mixtures to control both rice leaf blast and brown spot, 10 fungicides were evaluated to select a good partner of tricyclazole or carpropamid using mycelial growth inhibition test, spore germination test and green house trials against *C. miyabeanus.* Iminoctadine tris (albesilate), prochloraz, fenarimol, hexaconazole, tetraconazole, ferimzone+isoprothiolane mixture and ferimzone+tricyclazole strongly inhibited mycelial growth than other fungicides . Also iminoctadine tris(albesilate), ferimzone+tricyclazole, isoprothiolane+edifenphos and ferimzone+isoprothiolane showed abnormal spore germination with short germ tube and irregular germination site of *C. miyabeanus* at low concentration. In green house test, Iminoctadine tris (albesilate) at the dose of 75 ppm showed good efficacy of 98.7 % better than ferimzone+tricyclazole mixture at 400 ppm the efficacy of 96.2 %. Isoprothiolane+edifenphos, hexaconazole, fenarimol, prochloraz, and tetraconazole showed effective efficacy of more than 80% in each recommended application dose or less. Among them Iminoctadine tirs (albesilate) was good partner of tricyclazole or carpropamid to control rice leaf blast and brown spot in effective and economic respect. In field test to confirm the efficacy, the mixtures of carpropamid with iminoctadine tris (albesilate) 7+5% and tricyclazole with iminoctadine tris (albesilate) 20+5% showed excellent control efficacy of 97.8% and 96.7% , and 95.4 % and 94.6 % , respectively, on rice leaf blast and rice brown spot.

C-49. Application of fungicides for the control of clubroot of Chinese cabbage caused by *Plasmodiophora brassicae*. Kee don Han[1], Han sung Pyo[1], and Min woong Lee[2]. [1]Research institute, Sungbo Chemical Co. Goyang-si, Gyunggi-do, Korea, [2]Dept. Biology, Dongguk Univ. Chunggu, 100-715, Korea

For the control of clubroot of Chinese cabbage caused by *Plasmodiophora brassicae*, We tested several kinds of fungicide with the method of root-dipping in solution of fungicides, we evaluated the efficacy of fungicides with Chinese cabbages grown in pots and greenhouse which are artificially infested with resting spores of *Plasmodiophora brassicae*. In pot test, the best control of clubroot disease was obtained in mixture of chlorothalonil and pyrimethanil at 620+248 ppm followed by transplanting. When whole plants were dipped, some leaves of seedling were withered for 1 to 3 days whereas no phytotoxicity were showed on new shoots. In greenhouse trial, when seedlings of chinese cabbage were grown for 30 days after treatment of fungicides followed by transplanting, treatment of mixture of chlorothalonil and pyrimethanil at 620+248ppm was showed the best efficacy as compared with others, whereas, for 50 days, treatment of chlorothalonil at 1060ppm was showed the best efficacy. When the 10% chlorothalonil DP was incorpoated into soil at 30kg/10a followed by dipping the roots in the mixture of chlorothalonil and pyrimethanil, it was showed the lowest disease incidence and rates of withered-plant as compared with others as well as the mixture of chlorothalonil and pyrimethani at 50 days after treatment. This results suggest that treatment of the mixture of chlorothalonil and pyrimethanil, using by root-dipping method, is effective for the control of clubroot disease in Chinese cabbage.

C-50. Distribution of *Monilinia fructicola* isolates resistant to dicarboximide, procymidone, and carbendazim in Korea. Tae Heon Lim and Byeongjin Cha. *Department of Agricultural Biology, Chungbuk National University, Cheongju 361-763, Korea*

To evaluate sensitivity of *Monilinia fructicola* to dicarboximides used in controlling brown rot, the fungus was isolated from commercial peach orchards at Chochiwon (CH), Chongdo (CD), Gyeongsan (GY), and Youngduk (YO). The population shift of dicarboximide-resistant isolates of *M. fructicola* was investigated for 3 years since 1998. The frequency of procymidone-resistant isolates (PRI) was higher in CD and GY than in CH and YO. The frequency of PRI was higher in the mid-season (July to August) than the rest of the year. Cross-resistance rate of PRI to iprodione was over 87.8% during the investigation, and double-resistance to both procymidone and carbendazim was less than 10%. However, the rate of cross-resistant isolates to vinclozolin was low. In the orchards in GY and CH without spray of any fungicide, the PRI population was maintained persistently without much difference for 3 years. The results suggested that dicarboximide resistance of *M. fructicola* could be a problem in controlling brown rot and blossom blight on peach trees because it may take long time to recover population with sensitive isolates even in the absence of these fungicides.