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RELATIONSHIP BETWEEN OVERALL TEXTURE PREFERENCE AND FLAVOUR OF STORED APPLES

ABSTRACT. In the experiments the effect of storage technology on the relationship between texture and flavour of apples was established. In addition, the optimal values of firmness were determined by taking into consideration fruit texture and flavour. Apples of 'Elstar', 'Jonagold' and 'Gloster' cultivars were stored in a cold room at 3 oC in normal atmosphere, standard CA (5% CO2 : 3% O2) or ultra low oxygen conditions (1.5% CO2 : 1.5% O2). After removing apples from the store, their ripeness was differentiated by keeping them at either 0 or 18 oC for various periods of time. The fruits were subsequently divided into 12 classes of similar firmness and subjected to sensory tests in which the overall texture and flavour were determined separately for each cultivar and storage atmosphere. It was found that texture and flavour of apples were highly correlated. The optimal values of firmness determined by taking into consideration fruit flavour were very much the same as those based on the optimal texture of apples. However, there was a tendency towards a higher flavour preference for slightly softer apples. The results confirm that the most important factor which determines the flavour of apples and their texture is the cultivar. Among those three investigated the highest preference was shown for 'Jonagold' and the lowest for 'Gloster'.

Key words: apples, texture, flavour, sensory acceptability, storage conditions

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THE RELATIONSHIP BETWEEN FIRMNESS AND JUICINESS OF 'ELSTAR', 'GLOSTER' AND 'JONAGOLD' APPLES

ABSTRACT. The relations between the juiciness and firmness of apples stored under various conditions were investigated taking into consideration the effect of harvest date. Fruits of 'Elstar', 'Jonagold ' and 'Gloster' were picked on three harvest dates and kept at 3 oC at normal, standard CA

(5% CO2 : 3% O2) and ultra low oxygen (1.5% CO2 : 1.5% O2) atmospheres. After removing apples from the store, they were subjected to additional storage in a cold room or at room temperature for various periods to diversify their ripeness degree. Fruits were then sorted according to increasing firmness and divided into 12 classes. Juiciness of fruits based on instrumental measurement and sensory appraisal was then determined.

For all investigated cultivars the juiciness of stored apples was positively correlated with fruit firmness; however, some maximum in juice release during pressing for very firm fruits was noticed. The juiciness of apples stored under at CA and ULO conditions was higher than for those stored in a cold room. Moreover, the juiciness of apples from late harvest was higher as compared to those earlier harvested. During the sensory assessment, similarly as in instrumental measurement, the juiciness intensity sensation generally enhanced with increasing fruit firmness, although at a higher fruit firmness the tendency towards lowering the rating for juiciness intensity sensation was observed.

Key words: apples, firmness, juiciness, texture, storage conditions

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EFFECT OF ROOTSTOCKS ON GROWTH AND YIELD OF PLUM TREES

ABSTRACT. The influence of P. divaricata and Wangenheim Prune seedling rootstocks, as well as two clonal rootstocks 'Pixy' and 'GF 655/2', on the growth, yield, fruit weight and suckering of 'Oullins Golden Gage', 'Cacanska Najbolja' and 'Stanley' plum trees was investigated. One year-old trees were planted in heavy soil in a piedmont area in the south of Poland. The experiment was carried out in 1991-2000.

In comparison to P. divaricata seedlings all rootstocks tested reduced the growth of the three plum tree cultivars and increased their productivity. The effect of rootstocks on fruit weight was negligible in this trial. Suckering was a problem only with trees grafted on 'GF 655/2'.

Key words: plum, rootstock, growth, yielding

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BORON ADSORPTION IN SOIL AS INFLUENCED BY pH AND COMPETING ANIONS

ABSTRACT. The aim of the experiment was to examine adsorption process of B in soil as influenced by the presence of chlorate, molybdate, phosphate, silicate or sulphate anions. Boron adsorption experiment was carried out in laboratory conditions on two soils with different physico-chemical properties at concentrations of 125 or 250 ľmol B l-1 at pH from 5 to 9. Results showed that the magnitude of this process depended on soil type, pH and competing anions. On soil rich in organic matter, clay and oxides of Fe, Al, and Mn, adsorption of B was relatively high. With increasing pH values, it enhanced, reaching a maximum at 9.1-9.2. Regardless of soil type and level of applied B, its adsorption in soil was decreased as a result of the presence of phosphate and silicate anions by 17 and 13%, respectively. These results indicate that B was specifically adsorbed by soil constituents and competing anions had none or a small effect on B desorption process.

Key words: B adsorption, soil, competing anions

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INFLUENCE OF pH AND COMPETING ANIONS ON BORON ADSORPTION ON PYROLUSITE-COATED SAND

ABSTRACT. The aim of this investigation was to examine boron (B) adsorption on pyrolusite-coated sand in the presence of chlorate, molybdate, phosphate, silicate, and sulphate anions. Pyrolusite-coated sand was treated with B at a concentration of 55 ľmol l-1 with equimolar concentrations of the studied anions at pH ranging from 5 to 9. Adsorption of B on pyrolusite-coated sand without competing anions was used as the reference system.

Boron adsorption on pyrolusite-coated sand was affected by pH and the presence of competing anions. With increasing pH values it enhanced, reaching a maximum at pH 7.3. At higher pH values, B adsorption decreased. Only phosphate and silicate anions had some effect on this process reducing B adsorption on Mn oxides by 22 and 39%, respectively. This indicates that most B adsorbing sites on pyrolusite-coated sand were specific to this element.

Key words: boron adsorption, manganese oxides, anion competition

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EVALUATION OF AGRONOMIC PERFORMANCE OF SOME PLANTAIN (Musa AAB CV. 'AGBAGBA') LANDRACES AND COOKING BANANA (Musa ABB) CULTIVARS IN NIGERIA DRY FOREST

ABSTRACT. The outbreak of black sigatoka disease (BSD) has almost paralysed the plantain industry in Nigeria. Five landraces of the triploid BSD-susceptible false horn plantain cultivar 'Agbagba' and two starchy triploid BSD-resistant cooking banana cultivars ('Bluggoe' and 'Fougamou') were compared at two cycles (both main crop and first ratoon crop) at a planting density of 1600 plants ha-1 in the dry forest of South West Nigeria. The plants exceeded 300 cm in height. Sucker production was more prolific among cooking banana cultivars than in plantains. In the first case the tallest suckers reached the height of the main crop at harvest, while in plantains they were at early stages of development (peppers and early swords). The cooking bananas had the highest number of standing leaves at harvest and for the ratoon crop, their bunch weight was greater as compared to the plantain cultivars. The cooking banana, especially 'Bluggoe', had a short planting-shooting interval for both the main crop (13 months) and first ratoon (18.5 months) crop then other cultivars. There was a yield decline in the ratoon crop of the examined cultivars, except for 'Fougamou' showing a 24% increase. While the decline was pronounced among plantains (34.93 - 54.65%), it was very slight in 'Bluggoe' (13.16%). The latter was well adapted to the dry forest agroecology. The bunch weight of the main crop of cooking banana compared well to those of high yielding plantains. It has a good potential for commercial production because of its deep-seating corm, fast cycle and good bunch weight.

Key words: cooking banana, cultivar evaluation, number of standing leaves, plantain, planting-shooting interval

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DEVELOPMENT, SURVIVAL AND FECUNDITY OF *Rastrococcus invadens* (WILLIAMS) (HEMIPTERA; PSEUDOCOCCIDAE) ON FOUR HOST PLANTS

ABSTRACT. Comparative developmental and reproductive biology of R. invadens on Mangifera indica (mango), Ficus sp. (ficus), Plumaria sp. (frangipani) and Citrus sp. (citrus) showed that the time of R. invadens development was influenced by the host plant. Mango-fed nymphs exhibited the highest survival and the shortest developmental period (21 and 24 days for female and male, respectively) while the development of citrus-fed nymphs was the longest (26 and 24 days). Based on the shortest development (23.5 days) and the lowest intrinsic rate of increase (r) mango plant appeared to be the most preferred host for R. invadens. The value of (r) on all the host plants was positive.

Key words: Rastrococcus invadens, Citrus sp., Ficus sp., Plumaria sp. Mangifera indica, preferred

host, net reproductive rate (Ro), generation time (T), gross reproductive rate (GRR), intrinsic rate of natural increase (r)

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RESULTS OF DIVERSE PLANTING AND TRAINING SYSTEMS OF 'HARNAŚ' PEACH [Prunus persica (L.) BATSCH] IN CLIMATIC CONDITIONS OF POLAND

ABSTRACT. 'Harnaś' peach trees grafted on Rakoniewicka seedlings (P. persica) were trained as spindle (at densities 1142 and 1904 trees/ha), pillar and V-system (at densities 1904 and 2857 trees/ha) and as Y-system at a density of 2857 trees/ha. Tree growth was affected by the growing season, training system and planting density. Trees with a single leader (spindle and pillar) were more productive than those V- and Y-shaped. Training systems significantly influenced yield per tree. Yield per hectare was positively related to planting density, except of Y-system. The greater cropping ability of the highest planting density had a negative influence on average fruit weight. The largest fruit was obtained on the trees trained as spindle and V-shape at 1142 and 1904 trees/ha, respectively.

Key words: peach, planting density, training, pruning

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STORAGE PROPERTIES OF CZECH PEAR CULTIVARS 'ERICA' AND 'DICOLOR'

ABSTRACT. The paper shows results of the investigation concerning the storage properties of two new Czech pear cultivars, 'Erica' and 'Dicolor'. During storage a slow decline of fruit firmness and relatively low weight loss of both variety fruit were found. As well a low reduction of acidity of 'Erica' fruit was observed. After the full period of storage (180 days) the level of total soluble solids (TSS) was the same as at harvest.

Key words: pear, storage, 'Erica', 'Dicolor'

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EFFECTIVENESS OF TRIFLOXYSTROBIN IN THE CONTROL OF BULL`S EYE ROT (Pezicula spp.) OF APPLE

ABSTRACT. Effectiveness of trifloxystrobin, a new fungicide belonging to the strobilurin group, in the control of bull's eye rot of apples was evaluated during 1998/1999 and 1999/2000 seasons. Trifloxystrobin (Zato 50 WG, Novartis Crop Protection AG) was applied twice before harvest on apples of several cultivars and the percentage of fruit affected by Pezicula spp. was evaluated after storage. The tested fungicide at 75 g a.i. ha-1 provided a very good control of bull`s eye rot only under the low infection pressure, while at the rate of 100 g a.i. ha-1 it was very effective independently of the extent of the disease.

Key words: apples, storage, Pezicula spp., trifloxystrobin

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DECREASE OF Venturia inaequalis (COOK) ADERH. SENSITIVITY TO ERGOSTEROL BIOSYNTHESIS INHIBITOR AND DODINE FUNGICIDES

ABSTRACT. The ergosterol biosynthesis inhibitor (EBI) and dodine fungicides are well known and have been used frequently for many years in the control of apple scab in Poland. An obvious decrease of effectiveness of fenarimol and dodine was observed in 1998 and 1999 in apple orchards treated with these compounds several times during the last few seasons. The monitoring of dodine resistance conducted in commercial apple orchards in the Warka and Grójec region in 1999 showed in some cases a high level (more than 50%) of dodine-resistant strains in the population of Venturia inaequalis and the occurrence of 5 to 30% of dodine-resistant strains in its population in the majority of checked orchards.

Key words: apple scab, resistance, dodine, ergosterol biosynthesis inhibitors

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EFFICACY OF CHEMICAL AND NON-CHEMICAL TREATMENTS AGAINST BLACKCURRANT GALL MITE [*Cecidophyopsis ribis*(WESTW.)] AND THEIR INFLUENCE ON POPULATIONS OF TWO-SPOTTED SPIDER MITE (*Tetranychus urticae* KOCH) PREDATORY MITES (PHYTOSEIIDAE) AND APHIDS (APHIDIDAE)

ABSTRACT. The blackcurrant gall mite [C. ribis (Westw.)] is the most important pest of blackcurrants in Poland. In this study, the most effective method to control this species was the removal of infested buds combined with two treatments with endosulfan. It was also determined that this pesti-cide applied once, twice or three times during bloom did not affect phytoseiid mites, which

occurred in sufficient numbers to maintain the population of two-spotted spider mite at a very low level. Among the identified phytoseiid species, Typhlodromus pyri and Amblyseius andersoni were dominant. The increase in populations of A. andersoni after treatment with endosulfan during three successive years suggests that this species can be useful for an efficient regulation of two-spotted spider mite on blackcurrant. It was also observed that endosulfan applied against the blackcurrant gall mite effectively reduced aphid populations.

Key words: blackcurrant gall mite, phytoseiids, Typhlodromus pyri, Amblyseius andersoni, two-spotted spider mite, aphids

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INFLUENCE OF TWO SPRAYING PROGRAMMES ON OCCURRENCE OF SOME PESTS AND PREDATORY MITE*Typhlodromus pyri* SCHEUT. (PHYTOSEIIDAE) IN AN APPLE ORCHARD

ABSTRACT. The influence of two insecticide schedules on occurrence of the spider mites (Tetranychidae), apple rust mite (Aculus schlechtendali Nal), predatory mite Typhlodromus pyri Scheut. and several insect pests on the quality of the fruits was estimated during 5 year study in an apple orchard located in the south of Poland. Plot 1 was treated only with selective insecticides, while on plot 2 they were combined with fenitrotion, which in an earlier field experiment in Poland showed a high toxicity to T. pyri. It was found that on both plots spider mites were effectively controlled by T. pyri, which distinctly outnumbered Panonychus ulmi Koch. This indicates that T. pyri developed a resistance to fenitrothion. Due to used pesticides the population of insect pests on both plots declined and fruit quality improved.

Key words: Typhlodromus pyri, spider mites, biological control, selective pesticides

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ECOLOGICAL IMPACT OF NITROGEN FERTILIZATION

ABSTRACT. This paper presents the ecological aspects of nitrogen (N) fertilization. The negative effect of N on the environment can be observed in the case of both mineral and organic fertilizers. Application of N at high rates causes pollution of the air, soil and plants, as well as ground and drinking waters. Air pollution resulting from N fertilization is related mainly to the volatilization of nitrous oxide (N2O) and ammonia (NH3). In the last decade, concentrations of “greenhouse gases” in the atmosphere increased markedly, which was partly related to the emissions of N2O. It is estimated that N2O emission resulting from agricultural production contributes in 15% to the “greenhouse effect”. The application of mineral and organic fertilizers has the greatest influence on

this emission in agriculture.

High level of N2O in the air also destroys the ozone layer in the stratosphere (creating “ozone holes”). It is estimated that the annual decrease in the level of ozone in the stratosphere as a result of N2O excess in the air is approximately 0.05 %.

Atmospheric NH3 and its derivative – the ammonium ion (NH4+), return to the earth’s surface in dry and wet deposits and after microbial oxidation (nitrification) cause acidification of natural ecosystems and eutrophication of surface waters.

The contribution of plant production to the total emission of NH3 is approximately 18%. It is assumed that about 70% of NH3 losses in plant production is related to the application of N fertilizers. In Poland, the contribution of NH3 deposition to soil acidification is 30% whereas in the countries of the European Union (EU) the figure is 40-50%.

High rates of mineral N fertilizers and organic fertilizers also increase NO3- leaching into ground water. The highest risk of NO3- leaching occurs in light soils having a low water retention capacity. Intensive leaching of N takes place in the production of vegetable and root crops, and also during the fallow period. High NO3- status in the soil solution causes a general increase of NO3- level in plant tissues. Food containing large amounts of NO3- presents a high risk to humans and animals. Plant NO3- status is generally species- and cultivar- dependent, being considerably higher in vegetative than generative organs.

Prevention and reduction of N losses, and thereby minimization of environ-mental pollution due to N fertilization, can be achieved by applying N at appropriate rates at the right time, using slow-release and coated N materials, mixing NH4+4-depot” fertilization, avoiding fertilization along water courses, reducing N fertilization on steep slopes, properly storing and applying organic fertilizers, reducing the area of plant-free grounds, and by instructing farmers on good agricultural practices in sustainable production. fertilizers with soil, applying “NH

Key words: nitrogen fertilization; pollution of air, soil, drinking and ground water, plant contamination