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Cover photos: Top: Hydroponic cultivation of cherry tomato (More details in Passam *et al.*, pp 1-21); center right: Ripe highbush blueberry berries (More details in Prodorutti *et al.*, pp 44-56); bottom: Romanian peach var. 'Tina' (More details in Ivascu and Stinga, pp 107-110).

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Harold C. Passam, Ioannis C. Karapanos, Penelope J. Bebeli, Dimitrios Savvas (Greece) A Review of Recent Research on Tomato Nutrition, Breeding and Post-Harvest Technology with Reference to Fruit Quality (pp 1-21)

ABSTRACT

Special Feature: The continued importance of tomato (*Lycopersicon esculentum* Mill.) as a vegetable and salad commodity is reflected by the large volume of research on virtually all aspects of the crop. Since 2000, over a thousand scientific papers per year relating to tomato research have been published, not including those in the less widely read literature, conference and workshop proceedings. In the present paper, we survey recent findings in the areas of tomato nutrition, the influence of salinity on nutrition and growth, tomato breeding and genetic resources, and the post-harvest physiology, storage and ripening of fruit. Research findings are considered particularly with respect to fruit quality, as reflected in the quality standards of the European Union.

Fabio Stagnari (Italy) A Review of the Factors Influencing the Absorption and Efficacy of Lipophilic and Highly Water-Soluble Post-Emergence Herbicides (pp 22-35)

ABSTRACT

Invited Review: It is well known that post-emergence herbicide uptake into plant foliage and efficacy varies with plant and chemicals, and can be greatly influenced by adjuvants and environmental conditions. The penetration of herbicides into plant leaves is related to the physicochemical properties of the active ingredients, especially molecular size and lipophilicity. For a specific herbicide, uptake varies greatly with plant species and there is no simple method at the moment to quickly evaluate the leaf surface permeability of a plant. Furthermore, current evidence suggests that highly-water soluble, ionic herbicides may be more sensitive to some environmental conditions (low humidity and rapid drop drying) than lipophilic herbicides. Various adjuvants are being used to increase the penetration of herbicides into target plant foliage, but their effect varies with chemicals and plant species. The mechanisms of action of adjuvants in enhancing herbicide uptake remain unclear despite the effort made during the last three decades. A better understanding of the transcuticular transport of herbicides and the mode of action of adjuvants should lead to a more rational use of herbicides and minimize their negative impact on the environment.

Rosario Nicoletti, Francesco Raimo, Gaetano Miccio (Italy) *Diploaxis tenuifolia*: Biology, Production and Properties (pp 36-43)

ABSTRACT

Invited Mini-Review: Perennial wallrocket (*Diploaxis tenuifolia* (L.) DC) is a perennial herbaceous plant belonging to the *Brassicaceae* native of the Mediterranean area and western Asia, but has now become cosmopolitan. Once harvested as a spontaneous herb, today it is a crop species whose importance is increasing especially in Europe after the diffusion of ready-to-use salads. Leaves present interesting nutritional properties depending on their content in glucosinolates and some antioxidant compounds, such as vitamin C and flavonoids, and their consumption is recommended in the prevention of cancer and cardiovascular diseases. Italy is the main producer country in the world with over 1100 hectares cropped in 2003. However, production in home gardens and harvesting from the wild are still quite significant, which makes figures concerning the overall production underestimated. It is cultivated both in open fields and under plastic tunnels, mostly in rotation with other vegetable crops in areas of intensive horticulture. Besides its relevance as a food crop, it is also thought to possess therapeutic properties that have stimulated its use in the traditional medicine of several peoples in the Mediterranean and the Near East areas. An oil rich in erucic acid can be extracted by the seeds, introducing possible relevance for industrial applications. Aspects concerning biology, diffusion, cultivation, crop protection, industrial processing, nutritional properties and uses of perennial wallrocket are considered in this review.

Daniele Prodorutti, Ilaria Pertot, Lara Giongo, Cesare Gessler (Italy) Highbush Blueberry: Cultivation, Protection, Breeding and Biotechnology (pp 44-56)

ABSTRACT

Invited Review: Highbush blueberry is one of the most commercially significant berry crops. It is mainly cultivated in the United States and Canada, but also in Europe, Australia, Chile and New Zealand. Production of this crop is likely to increase in response to increased consumer demand for healthy foods, including the antioxidant-rich blueberry. This review describes several issues and developments in sustainable blueberry farming, including agronomical and cultural techniques (mulching, irrigation, the beneficial effects of mycorrhizae and fertilization), disease management (biology and control of common and emerging diseases), pest management, pollinators (effects on fruit set and production), conventional breeding and molecular techniques for examining and engineering blueberry germplasm. This paper describes past problems and current challenges associated with the commercial production of highbush blueberry, as well as new approaches and techniques for improving crop quality and future perspectives for innovative research.

Yaşar Akça, A. Aytekin Polat (Turkey) Present Status and Future of Walnut Production in Turkey (pp 57-64)

ABSTRACT

Invited Review: Turkey is one of the most important producers of walnut in the world. In 2005, Turkey ranked fourth in world production with 133,000 t of production. According to the average 2000-2005 statistics, Turkish walnut production accounts for 8.89% of the World's total walnut production. This important role is due to Anatolia being a germplasm center, and to its suitable ecological conditions. Walnut has an exceptionally wide natural distribution in Turkey and it is a plant which does not need much labour and annual high operating costs. In general, walnut has been grown at the edge of farmlands in recent years in Turkey. Cultivated mainly for its nutritious nuts, it is used as a food, in the chocolate industry, for baked foods, and in the pharmaceutical and cosmetic industries. The leaves and green shells are used as a pigment in Turkey. Continuous seed propagation for thousands of years in Turkey has given rise to a great number of seedling walnut trees, which represent valuable walnut gene resources. The number of native trees is estimated to be over 6 million and they possess large genetic variability in yield, nut and kernel characteristics, late bud breaking, late flowering, winter hardiness, tolerance to disease. After recognition of the importance of propagation by grafting and budding by growers in recent years, the orchards are being established by standard cultivars. These standard walnut orchards are generally planted with cultivars selected in Turkey.

Lena Ekelund, Fredrik Fernqvist (Sweden) Organic Apple Culture in Sweden (pp 65-75)

ABSTRACT

Invited Review: Sweden is a net importer of all fruit, including apples – the fruit favoured by Swedish consumers. Domestic apple production holds a market share of a fifth of the total supply, while the domestic market share of organic apples is only 11%. The fact that organic imports are transported long distances may be in conflict with the environmental arguments. The organic share of around 1% of total apple consumption is significantly lower than the 3% organic share of all food sales. The price premium of organic apples is an additional two thirds of the conventional price. Organic apple culture constitutes of less than 10% of total Swedish apple acreage, while the area certified by the association *KRAV* is less than 5%. This label has been crucial in the marketing of organics but may now be replaced by EU certification. A few vertically integrated retail chains, with continuously fewer and bigger units, dominate the Swedish food marketing system, but organic apples are often sold directly to the consumers, as fresh or as processed products, which may give the producer a higher share of the price premium paid for organic products. Considering the brand strategies of the supermarkets, the key to market success may be to find a niche in the small-scale system, possible with ties to the tourist industry, since this offers a channel for small volumes and a wide range of unusual varieties. This combines the advantages of local products with those of organics.

Kalomira Elena (Greece) Asparagus Diseases (pp 76-83)

ABSTRACT

Invited Review: Crown and root rot is the most serious disease of asparagus worldwide resulting in plant yellowing, dieback and wilting. As the disease progresses, root parenchyma is completely destroyed whereas crown interior is discolored. The fungi that play major role to this disease are species of the genus *Fusarium*. The two dominant species are *F. oxysporum* f. sp. *asparagi* and *F. proliferatum*. The species *F. solani*, *F. culmorum*, *F. subglutinans* and *Phytophthora* spp. are less frequently

isolated from diseased asparagus plants. Besides, *Fusarium* species are the main biotic factors responsible for asparagus decline syndrome. Seeds, crowns, root residues and field soil consist the pathogen inoculum sources. Yield loss results from plant death and from smaller and fewer spears. Other economically important fungal diseases are asparagus rust, caused by *Puccinia asparagi* that infects asparagus green parts and the purple spot, caused by *Stemphylium* spp. which appears as brown lesions with dark purple margins on the main stems, branches and cladophylls. Both diseases cause a severe drop of cladophylls while the plants turn yellow or brown; they also reduce the vitality of the root system resulting in the subsequent year yield reduction. Other fungal diseases of asparagus include stem blight caused by *Phomopsis asparagi*, and Cercospora blight caused by *Cercospora asparagi* causing subsequent yield loss, particularly in humid areas. Furthermore, several viruses have been found to infect asparagus causing latent infections.

Antonia Ivascu, Adriana Stinga (Romania) Collecting, Preserving and Using Gene Sources from Germplasm Found in Peach (*Prunus persica* L. Batsch.) Breeding in Romania (pp 84-90)

ABSTRACT

Invited Mini-Review: The collection, preservation and use of peach genetic resources from the germplasm found in SCDP-Baneasa is focused on disease and pest resistance (especially to *Taphrina deformans*, *Sphaerotheca pannosa* var. *persicae*, *Monilinia*, *Cytospora cincta*, *Myzus persicae*, *Cydia molesta*, and *Anarsia lineatella*), fruit quality (especially taste and flavour), seasonality (with a ripening calendar that exceeds 3-4 months), adaptability of cultivars and rootstocks to adverse environmental conditions and also on high yield potential. The use of different sources of genes, including germplasm from China, or other areas with a large biodiversity confers resistance to diseases of the new peach and nectarine varieties bred and created in Romania. Open pollination, hybridizations and back-crosses have been used as breeding methods, and have been combined with screening of progenies in the juvenile stage in greenhouse to reduce selection cycles and evaluation time.

Mateja Germ, Vekoslava Stibilj, Ivan Kreft (Slovenia) Metabolic Importance of Selenium for Plants (pp 91-97)

ABSTRACT

Invited Mini-Review: Selenium (Se) is a trace element that is both an essential nutrient for humans and animals and an environmental toxicant; the boundary between the two roles is narrow and depends on its chemical form, concentration, and other environmentally influenced variables. Se is important in the metabolism of cyanobacteria and some plants, being involved in their antioxidative processes. The essentiality of Se to higher plants, however, is still under debate. Although it is harmful for plants in high concentrations, it can exert beneficial effects at low concentrations. It can increase the tolerance of plants to UV-induced oxidative stress, delay senescence, and promote the growth of ageing seedlings. Recently it has been shown that Se is able to regulate the water status of plants under conditions of drought. It is widely distributed on the Earth's surface and available for plants in at least small traces. Cultivation of plants enriched with Se could be an effective way of producing Se-rich foodstuffs which can be beneficial to health. Se is also a major contaminant in the effluents from some oil refineries, power plants, and in mine drainage water. Se has become the primary element of concern in much environmental contamination because of its bioaccumulation in food webs. Bioaccumulation of Se is leading to toxic impact and changes in communities. However, it is possible to remove it from soils and Se-contaminated agricultural drainage water using plants in a phytoremediation process.

Jolita Radušienė (Lithuania) Conservation and Evaluation of Selected Medicinal and Aromatic Plants from Lithuania (pp 98-106)

ABSTRACT

Invited Mini-Review: This review focuses on research of medicinal and aromatic plants in Lithuania and describes how the conservation of genetic resources of these plants is considered. Biological peculiarities of species and their sources of raw material determine the mode of conservation including *in situ* and *ex situ* methods. The data on evaluation of essential oils of native species (*Achillea millefolium*, *Acorus calamus*, *Origanum vulgare*, *Helichrysum arenarium*, *Hypericum perforatum*, *Thymus* ssp., *Tanacetum vulgare*) of commercial value in herbal medicine are presented. The morphological, chemical and ecological markers support the selection and taxonomical identification of intra-specific diversity and are essential for germplasm conservation and utilization. The exploitation of the chemical diversity of evaluated species may be a potential source of genetic variation to allow selecting the valuable material for breeding.

ABSTRACT

Invited Mini-Review: Grapes have the longest history of all the cultivated fruits and are among the most widely grown. Cooler temperatures and high relative humidity and/or moisture favour the development of fungal diseases of grapes. These diseases affect the leaves, shoots, stems and fruit. Fungal diseases can render fruit unusable and can very easily cause severe losses in yield. Grapevines are fairly adaptable plants, growing in a wide variety of soil types, from light sand to packed clay, and flourishing around the globe in the temperate bands between 20° and 50° latitude, north or south of the Equator. Black rot (*Guignardia bidwellii* (ELL.) V. et R. (anamorph: *Phyllosticta ampellicida* (Engelm.) van der Aa), white rot (*Metasphaeria diplodiella* (Viala et Ravaz) Berl. anamorph: *Coniella diplodiella* (Speg.) Pet. et Syd.), powdery mildew (*Uncinula necator* (Schein.) Burr. anamorph: *Oidium tuckeri* Berk.), downy mildew (*Plasmopara viticola* (Berk. et Curt.) Berl. et de Toni) and grey mould (*Botrytis bunch rot* – *B. fuckeliana* (de Bary) Whetzel) are the most common fungal diseases of grapevine. Recently, decline symptoms (*Phaeomoniella chlamydospora* (W. Gams, Crous, M. J. Wingf. & L. Mugnai) in young grapevines have increased in areas with new planted vineyards resulting in poor vineyard establishment. In this review we describe symptoms of disease and their management, and the effect of climatic factors.

Dobrivoje Ogašanić, Slobodan Milenković, Olga Mitrović, Miodrag Kandić, Branislav Zlatković, Ljiljana Babić (Serbia) Serbian Dried Fruit Research (pp 111-116)

ABSTRACT

Invited Mini-Review: Serbia has a very long tradition of plum drying, and it used to be a recognized prune exporter on both a European and global scale. Investigations in the field of fruit drying have not always been in accordance with production and export of dried fruits, prunes in particular. In times of the largest production and export, no adequate attention was devoted to the development and advancement in the respective field, i.e. application of the results of the study, which accordingly resulted in a decrease in production and export in the ensuing period. Research aimed at advancing the technology and suitability of particular cultivars for drying as well as quality of prune have been pursued ever since the 1960s. Convective drying is the most common method of fruit drying, especially plum drying, and is the major drying method in Serbia. The latest investigations include current research in the field of kinetics of convective drying, study of newly developed and/or combined methods of fruit drying (osmotic, vacuum, lyophilization, etc.) as well as procedures applicable to finishing of dried fruits.

A. Šrobárová (Slovak Republic), M. Buško, J. Perkowski (Poland) Kinetics of DON, NIV and ERG Formation in Grain of Two Wheat Cultivars after Inoculation with Three Isolates of *Fusarium culmorum* (W. G. Smith) Sacc. (pp 117-124)

ABSTRACT

Original Research Paper: During two vegetative periods – the end of September to the end of July – the grain of two wheat cultivars ('Hana' and 'Samanta') was inoculated with three isolates of *F. culmorum* (W. G. Smith) Sacc. Isolate I1 (KF 350) was the nivalenol (NIV)-producing chemotype while I2 (Haniska) and I3 (Vranov) were deoxynivalenol (DON)-producing chemotypes. In all experiments as well as in controls analysis of group B-trichothecenes (NIV, DON) and ergosterol (ERG) concentration was performed. Both wheat cultivars possessed resistance to invasion and to toxin accumulation and degradation (mainly 'Hana'). This component of resistance can be seen by kinetics curves where increased toxin production appears mainly after 14 and 21 days after inoculation. In spite of this, toxin production had a linear kinetics and small concentrations could be observed. However, a slight deviation from linearity was observed in 1998 at the 2nd and 3rd week of vegetation while in 1999 at the 3rd and 4th week. The kinetics of ERG biosynthesis can be described as linear but the amount of fungal biomass production depends on the environmental condition. *F. culmorum* isolates could be differentiated according to their chemotype; mycotoxigenicity was also confirmed. This is the first report of trichothecene contamination and their distribution during vegetation harvest in Slovakian wheat.