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THE REAL WINNERS OF HEAT AND DROUGHT: SUSTAINABLE GARDEN LANDSCAPING

Katrin Lugerbauer, ECHTE HITZENPROFITS. NACHHALTIGE GARTENGESTALTUNG MIT TROCKENHEITSLIEBENDEN STAUDEN
(Real Winners of Heat: Sustainable Garden Design with Drought-Loving Perennials)

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Katrin Lugerbauer has been dealing with gardening and nature-related topics for many years. The author is particularly interested in the use of perennials in accordance with the requirements of a given site. With the right choice of plants, flowerbeds can be shaped more easily, and dry or shady places can also "bloom". In her books, the author combines gardening descriptions with appropriate photographs from her own garden flowerbeds.

Climate change, drought seem to define modern gardens to a growing degree. But what should be done if rain is increasingly common? Preventive shaping of gardens with resistant, thermophilic perennials which – at the same time – can survive without constant watering, is becoming an important goal of many gardeners. In her book "The Real Winners of Heat. Sustainable Garden Design with Drought-Loving Perennials", K. Lugerbauer shows readers how to shape dry sites sensibly and sustainably. In this case, it is helpful to look at the natural location of the plants, because there are many heat profiteers (winners), which can easily survive the drought. Katrin Lugerbauer shows 15 tried-and-tested combinations of ornamental plants, including their alternatives and supplements that are relevant to the seasons. There are already enough plants that need such conditions to grow optimally in hot weather: permeable sandy soils, areas with low rainfall, sunny locations with poor soil substrate. This book by K. Lugerbauer serves a purpose of finding such plants. The basic assumptions of the book include the following conditions: multifaceted design of gardens and flower beds, protection of natural resources, ecological thinking in gardening, appropriate plant selection ("which plant is suitable?"), use of the dynamics of plant development, optimization of plant care, and selection of plants from the existing pool of diversity. According to K. Lugerbauer, climate change requires the use of new plants that – despite originating from the Mediterranean, steppes, prairies or various coastal areas – must also cope with Central European winters. In modern gardens, it is necessary to use the dynamics of plant development, which includes the use of annual and biennial plants and short-lived perennials (often propagated by sowing). Spring-flowering plants (geophytes) and bulbous plants are also used, as they tend to complement the perennials. There is diversity in the flowerbed, which is also strongly correlated to the season. Optimizing care includes changing the existing soil, using a soil cover, using specific treatments to make the flowerbed more resistant to drought. Native wild perennials are not only resistant, but also support the representatives of the animal kingdom in the garden, dry shady areas have huge shaping potential, in the case of quick action, resistant annual and biennial plants should be used (using sowing).

Flower beds and gardens in drought and heat conditions are undoubtedly very diverse and limiting ourselves to just a few plants is clearly an overly simplistic approach. Luckily, K. Lugerbauer draws attention to several real winners in the current conditions of climate change. Such winners include primarily: mugworts (*Artemisia)*, dyer's chamomile (*Anthemis tinctoria*), spurges (*Euphorbia*), various types of thistles, various types of wild or species tulips, or various species of ornamental sage. Mugworts, especially species with silvery foliage, reach their best form only in hot weather.

Many mugworts develop stolons in poor soils: this is an excellent botanical property. They combine with their partner perennials and provide that sought-after southern charm at the site. Shiny, bright flowers on a hemispherical "leaf bush"; this is how yellow chamomile presents itself, a perennial friendly to insects, which also has excellent garden varieties. They bloom bright yellow (including the 'Wargrave' variety) and grow into a large plant within a single season. Euphorbias, on the other hand, have deep roots and durable leaves. A large number of Euphorbias prefer sunny locations and are decorative all year round. Their yellow-green flowers appear from spring to summer. Euphorbias

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are often treated as plants of the future. Thistles have a variety of defense capabilities in dry locations: they defend themselves against being eaten by animals. In the garden, we are happy that hollies, globe thistles and other thistles grow well, not limited by drought. Tulips are small and act delicately, but they are not sensitive to weather conditions. Unlike their larger "garden mates," wild tulip species are more durable, because they come from the steppes or mountainous areas. Their introduction to garden cultivation tends to pay off. Sage is very friendly to insects, very colorful, and has a second flowering stage when cut after bloom. Sage flowers are a great benefit to insects in gardens. In addition to the classic garden varieties, a large number of wild species are waiting to be cultivated in our gardens in conditions of heat and drought.

This book by K. Lugerbauer is undoubtedly extensive. It begins with introductory considerations: "Gardening in dry locations, is it even possible?". It was written by the well-known perennial gardener Christian H. Kress. According to him, perennial gardens are possible without regular watering. However, this requires basic knowledge of the requirements of individual plants. K. Lugerbauer's book consists of the following basic components: "Why do we care about droughts in the garden" (pp. 6-15); "Inspiration from nature" (pp. 16-29); "Ecological and sustainable garden design" (pp. 30-41); "In practice – deciding, planning, establishing, caring for, maintaining" (pp. 42-71); "Ideas about plants for dry locations" (pp. 72-135); "Service" (pp. 136-142).

In the "Why do we care about drought in the garden" section, the author discusses the relationship between rainfall and temperature, extreme weather conditions, plants compatible with the site conditions, proper watering of gardens, drought stress in spring, efficient use of water, and gardening in harmony with nature. Nowadays, drought is felt as a huge burden in many gardens. Hence, the importance of using resistant, heat-loving perennials is being raised, so that you can also fully enjoy your gardens in the summer. However, determining whether a garden is experiencing a drought is associated with the impact of several factors, primarily its geographical location. High temperatures usually exacerbate the problem of drought. Watering in the evening reduces water evaporation, and thus its consumption. Drought stress in spring is a major threat to plants. However, using soil cover in the garden reduces evaporation and heating of the soil (including mineral cover). It is assumed that 1 l of water per m2 moistens 1 cm of soil. This means that a watering can with 20 l of water per m2 penetrates 20 cm of soil.

The next part of the book bears a characteristic title "Inspirations from nature". Plants from natural sites offer valuable information in creating gardens resistant to drought and the ongoing climate change. Such plants grow on slopes, sandy soils, or stony ground. These include specimens with a short vegetation period (so-called geophytes), with specific leaf structure, silvery foliage; all associated with dense hairs, shorter lifespans, or deep roots. The plants mentioned in this chapter come from both European areas (including mullein, wild thyme, bloody cranesbill, pasqueflower, rockrose), and Mediterranean areas where hot dry summers dominate, but with abundant rainfall in the winter. Examples of plants from Mediterranean areas include: species of calamine, goldilocks aster, asphodel, various species of euphorbia, or Italian helichrysum.

A large number of garden plants that thrive in sunny locations come from the prairies of North America. Those typically are grasslands once inhabited by herds of bison and other herbivores. The prairie areas are also diverse: the eastern part of the original prairie is characterized by rainfall of 600-1000 mm and soils rich in mineral components. These are the areas of today's states of Minnesota, Iowa, Illinois and Missouri. Typical representatives of tall-grass prairies include: phloxes, dioecious plants, coreopsis, sunflowers, rudbeckias and asters. Further west in the USA, rainfall becomes significantly less abundant. These are areas of prairies with short grass (from Montana to New Mexico and Texas). Intermediate areas include the so-called "mixed grass prairie." Africa also provides many interesting plants; they come from the Drakensberg Mountains, including tritomas, monbrecias, and delospermae. Numerous species of grasses come from arid areas (p. 27). The oldest gravel garden was established by Beth Chatto in the 1990s. Gradually, the range of plants is expanded with new species and varieties.

The next part of K. Lugerbauer's book is devoted to "Ecological and sustainable garden design". This part addresses the following problems: garden planning, the issue of diversity, the problem of creating gravel gardens, the life of wild bees in gardens, accepting the dynamics of plant development, and creating sustainable plant communities. According to K. Lugerbauer, gardens and nature are closely linked. Gardeners should also support nature; a compromise must be sought between

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human demands and the interests of animals and the ecosystem at large. Gardeners should seek to create a diversity of species in their gardens. This allows for the existence of colorful gardens, including gravel gardens, and the simultaneous life of numerous insects (especially wild species of bees, butterflies and beetles). The ultimate goal of gardening should be establishing sustainable plant communities in specific gardens.

The next part of the book is devoted to best gardening practices: decisions, planning, establishment, care and maintenance of drought-resistant flowerbeds and gardens. This part deals with site and soil assessment, actions needed to alter the composition of the soil and the possibilities of its depletion, as well as its preparation for planting. Planning and establishment of flower beds and gardens includes: the problem of plant composition, natural division of plants, planting schedule, the problem of soil cover (including gravel cover for dry flower beds). The author's comments on long-term care in gardens in dry areas are important.

The most extensive part of the book is devoted to the "Ideas about plants for dry locations". The author creates lists of plants to which she gave characteristic names: "Yellow and pink – a warm and colorfully varied flower bed"; "Baptisia and company"; "Shiny through summer"; "Flowers in late summer"; "Lush surface of perennials on the roof"; "Three Mini-Compositions of Resistant, Fast-Growing Plants"; "With Tulips Through Spring"; "Exotic Contrasts"; "Pure Nature with Domestic Wild Plants"; "Silver Leaf and Opposite Lights"; "Colourful Meadows of Gravel Beds"; "Crown of Walls, Plant Containers and Hot Mini-Beds"; "Further Specific Plants That Grow in a Drought"; and "Dry Shade". All of the listed plant combinations include: "Basic Plant Combinations"; "Ideas for Expanding the Plant Set"; "Plants for Dynamics" and "Bulbous Plants". When it comes to the "Yellow and Pink – a Warm and Colourfully Diverse Flowerbed" combination, it includes the following plants: yellow chamomile (with cream-yellow varieties); cluster catnip, hybrids of smooth oregano and varieties of sage. "Baptisia with Company," on the other hand emphasizes the blue baptisia, Pyrenean needlewort, bearded penstemon, reed beetle, and Mattioli's atamanta. The "Shining Through Summer" list includes: Louisiana mugwort 'Valerie Finnis', yellow loosestrife, red spurwort 'Alba', steppe spurge, clustered catnip 'Six Hills Giant', cypress santolina. "Flowers in Late Summer" includes the following plants: hybrid garlic 'Millenium', lesser calamint, yellow aster, oregano 'Hopley', oriental sphaerocephalus 'Karley Rose', and Baikal skullcap. There are also many interesting plants in the "Lush surface of perennials on the roof" combination. These are: Louisiana mugwort 'Valerie Finnis', feather reed grass 'Karl Foerster', steppe spurge, Lindheimer's gaura, Fassen's catnip, Russell's phlomis, downy sage.

The author distinguishes three mini-compositions comprising resistant, fast-growing plants. The following stand out here: "White and yellow and silver"; "Flowerbed with bearded penstemon" and "Garlic composition". These compositions are very useful for small garden areas. The "With tulips through spring" composition is also very characteristic. It includes tulips suitable for dry and hot sites, perennials that bloom at the same time as tulips (heartleaf bergenia, several species of euphorbia, woad, clustered catnip), as well as perennials characterized by an early start to vegetation (willowleaf enchanter's nightshade, Mairei's fescue, lamb's ear, and large-flowered verbena 'Bampton'). The "Exotic contrasts" composition is also very effective. It includes: agastache 'Serpentine'', Louisiana mugwort 'Valerie Finnis', purple coneflower varieties, eucalyptus Eucalyptus gunnii 'Azura', perovskia, castor bean plant.

"Pure nature with native wild plants" refers to the country's wealth of perennials. They include: willowleaf coneflower, red cranesbill, helianthemum, mountain rye (Laserpitium siler), common birdsfoot trefoil, thorny restharrow, meadow sage, pigeon's foot.

Silvery foliage offers great potential in shaping gardens. We can distinguish: gray foliage with hairs, as well as gray-blue foliage with shiny leaves or a layer of wax. Many plants with grey foliage and hairs are known: yarrow, anaphalis, hairy cattail, viperworts, dyeworts, sages, woolly and hairy stachys. In the latter case, among others, red thistle, species of holly, spurges, gypsophila, grasses with blue foliage, or common rue. Typical in dry gardens are "Colourful meadows of gravel borders". These include: fernleaf yarrow, Austrian mugwort, common globe thistle, woad, sages, simple stachys.

One should not forget about the "Wall Crowns, Plant Containers, Hot Mini-Flowers". There are many small plants: alyssum, asters, poppy mallow (*Callirhoe involucrata*), bluebeard, myrtle spurge, hyssop, and broom grass. Nowadays, we can mention a number of "new" species for the garden, where plants that like drought grow. These include numerous species of sage, moltkie, geraniums, botanical species of echinacea, as well as yellow-flowering Engelmannia peristenia, the so-called red

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prairie clover (*Dalea purpurea)*, or *Monarda bradburiana*. One should also not forget about asters, as well as many herbs of Mediterranean origin. When the roof of leaves stops the rains, then conditions for dry sites quickly develop. According to K. Lugerbauer, it can also be green and blooming in "Dry Shade". The author devotes a lot of attention to dry shade gardening sites. In this context, she lists the following plants: "Resistant plants for dry shady sites"; "Ground cover plants, grasses and ferns"; "Something is always growing!" (particularly resistant native perennials) and, finally, annual and biennial plants for dry and sunny sites. Resistant plants include numerous geophytes (snowdrops, squills, alpine violets, glory-of-the-snow, wood anemone, corydalis, toothwort). Very resistant are corydalis: yellow and pale yellow, lily of the valley, almond-leafed spurge, spring pea, purple-blue recurrence, large-flowered deadnettle, as well as European species of epimediums. Later, various geraniums, woodland geranium, Welsh meconops, and large-flowered telima bloom. The latest to bloom is the aster (*Aster ageratoides*).

Ground cover plants, grasses, and ferns also play an important role in dry shade. These include: varieties of lesser and greater periwinkle, large-flowered comfrey, and ivy. Shade-loving grasses and ferns are also of great value. Native perennials can grow even in the most unfavourable conditions. These include: stinking geranium, stinking hellebore, tall skullcap, greater celandine, nettle-leaved bellflower, sticky sage, and woodland scabious.

K. Lugerbauer's book "Real Winners of Heat: Sustainable Garden Design with Drought-Loving Perennials" deserves the attention of Polish readers. The author addresses in her work the basic problems of crafting dry gardens, practical problems of gardens in drought and heat conditions, and finally proposes original combinations of plants that she describes as true winners of heat and drought. The book deserves wide dissemination in many countries, including Poland, where the phenomena of climate change, especially long-term drought, are intensifying. So far, there is a lack of the latest knowledge about plants resistant to drought and heat in Polish and European conditions. This gap can be successfully filled by K. Lugerbauer's book.

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