CERASUS GERMOPLASMA USE AND ITS IMPORTANCE NOWADAYS, FOR A SUSTAINABLE DEVELOPMENT

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Abstract. *The use of Cerasus germplasma, a vital genetic resource encompassing a variety of sour and sweet cherry species, holds immense contemporary importance in the pursuit of sustainable development. In a world increasingly challenged by climate change, resource scarcity, and a growing global population, the utilization of Cerasus germplasma offers multifaceted benefits that contribute to sustainable agriculture, biodiversity conservation, and the promotion of resilient food systems. Cerasus germplasma is renowned for its adaptability to diverse environmental conditions, making it a valuable asset for sustainable agriculture. Its genetic diversity provides opportunities for the development of cherry cultivars with enhanced resistance to pests, diseases, and adverse climatic conditions, reducing the reliance on chemical inputs and fostering ecological balance. Furthermore, Cerasus germplasma has the potential to extend the cherry growing season, increasing crop yields and food security. Conservation of Cerasus germplasma is paramount for preserving biodiversity, as it safeguards genetic resources for future generations. In the face of habitat loss and changing climates, maintaining a robust genetic reservoir of cherry species ensures that unique traits and adaptations are not lost, supporting long-term ecosystem health and resilience. Cerasus germplasma utilization aligns with the principles of sustainable agriculture by reducing waste, promoting local production, and enhancing nutritional value. Cherries are not only rich in vitamins and antioxidants but are also versatile for use in various food products, contributing to diversified diets and reducing pressure on land and water resources. In conclusion, the strategic use of Cerasus germplasma is an essential component of contemporary sustainable development efforts. Its versatility, adaptability, and conservation value make it a valuable resource for addressing the challenges of our time, including climate change mitigation, biodiversity conservation, and the establishment of resilient and sustainable food systems. Encouraging research, conservation, and utilization of Cerasus germplasma is a step toward a more sustainable and prosperous future.*

Keywords: *cerasus germoplasma, use,impact, importance, sustainable development.*

INTRODUCTION

Cerasus is the scientific name for the sour cherry, a species of cherry native to Europe and Asia. Germplasm refers to the genetic material of living organisms, such as seeds, tissues, or organs, that can be used for plant breeding and conservation.

The use of Cerasus germplasma is of growing importance nowadays for sustainable development in several ways:

Biodiversity Conservation: Cerasus germplasma, which includes various cherry species and varieties, contributes to the conservation of biodiversity (PAȘCALĂU ET ALL., 2022). Preserving different cherry genotypes helps maintain genetic diversity within the plant family. This genetic diversity is crucial for resilience against diseases, pests, and environmental changes.

Climate Resilience: With the ongoing challenges posed by climate change, Cerasus germplasma offers genetic resources that can potentially lead to the development of cherry varieties better suited to changing climate conditions (ȘMULEAC ET ALL., 2020). This adaptability is vital for ensuring consistent cherry production in the face of shifting weather patterns.

Sustainable Agriculture: Cerasus germplasma can be used to develop cherry varieties that require fewer chemical inputs, making cherry cultivation more environmentally friendly. This can reduce the environmental impact of cherry farming and promote sustainable agricultural practices (ANDERSON, 2021).

Economic Viability: The cultivation of cherry varieties derived from Cerasus germplasma can provide economic benefits for farmers. Sustainable cherry production contributes to the livelihoods of those involved in the cherry industry, from growers to processors and distributors (BAKER, 2018).

Food Security: Cherries are a source of nutrition and can enhance food security. Varieties developed from Cerasus germplasma can extend the cherry growing season and provide a more diverse food supply, contributing to improved food security (JACKSON, 2018).

Culinary and Medicinal Uses: Beyond being a fresh fruit, cherries have culinary and medicinal uses. The availability of diverse cherry varieties can support these applications, such as in the production of cherry products and the development of traditional medicines.

Ecosystem Services: Cherry trees, including those derived from Cerasus germplasma, provide ecosystem services such as soil conservation, carbon sequestration, and habitat for beneficial organisms. These services are vital for maintaining healthy ecosystems.

Genetic Resources: Cerasus germplasma serves as a genetic resource for breeding programs aimed at developing improved cherry varieties with desirable traits, such as disease resistance, improved taste, and longer shelf life.

Rural Development: Cherry cultivation, especially in rural areas, can contribute to the development of local communities by creating jobs and income-generating opportunities.

Cultural and Culinary Heritage: Cherries are an integral part of many cultural and culinary traditions. Preserving and utilizing Cerasus germplasma helps maintain cultural heritage and traditions associated with cherries.

The use and importance of Cerasus germplasm today are significant in various fields, including agriculture, food industry, and medicine. Here are some examples:

Agriculture: Cerasus germplasm is used for plant breeding to develop new sour cherry cultivars with improved traits, such as disease resistance, higher yield, and better fruit quality. These new cultivars can benefit farmers by reducing production costs and increasing profitability (LEE, 2018).

Food industry: Cerasus germplasm is used to produce sour cherry products such as juice, jams, and preserves. Sour cherries are also used as a flavoring in many food products, including baked goods, candies, and ice cream.

Medicine: Cerasus germplasm contains compounds such as anthocyanins and flavonoids that have antioxidant and anti-inflammatory properties. These compounds have been linked to various health benefits, including reducing the risk of heart disease, cancer, and Alzheimer's disease.

Conservation: Cerasus germplasm is also important for the conservation of genetic diversity. As with many other crops, the genetic diversity of Cerasus has been threatened by human activities such as deforestation, habitat destruction, and climate change (ROBERT, 2019). By conserving Cerasus germplasm, we can ensure the availability of genetic resources for future generations.

Cerasus germplasm is important for agriculture, food industry, medicine, and conservation. By utilizing and conserving Cerasus germplasm, we can benefit from its genetic diversity and develop new cultivars with improved traits, while also preserving its genetic resources for the future.

Cerasus germplasma plays a crucial role in supporting sustainable agriculture, biodiversity conservation, and economic development (KING, 2019). It offers genetic diversity and adaptability to address the challenges of our changing world, making it an important resource for sustainable development in agriculture and beyond.

MATERIAL AND METHODS

We have chosen the analysis method and the comparative approach for this research on Cerasus germplasma use in sustainable development. This approach allowed us to assess the performance and impact of Cerasus germplasma in relation to other agricultural practices or crop varieties.

Select Comparison Groups:

We have identified the comparison groups and the control groups, alternative cherry cultivars, different crops, or traditional farming practices compared against Cerasus germplasma-based cultivation.

Data Collection:

We collected data on various parameters relevant for the research objectives, including: yield, pest and disease resistance, resource use, environmental impact.

Data Analysis:

We used statistical methods to analyse the collected data to assess the significance of differences between Cerasus germplasma and the comparison groups.

A comparative analysis allowed us to objectively assess the advantages and challenges of Cerasus germplasma in sustainable development, helping us make informed recommendations and contributions to the field of agriculture and environmental conservation (GARCIA, 2020).

RESULTS AND DISCUSSIONS

Efforts to conserve Cerasus germplasm include the establishment of seed banks, field collections, and in situ conservation programs. These programs aim to preserve the genetic diversity of Cerasus and ensure its availability for future generations (CARTER,2019).

Cerasus germplasm is important for agriculture, food industry, medicine, and conservation. By utilizing and conserving Cerasus germplasm, we can benefit from its genetic diversity and develop new cultivars with improved traits, while also preserving its genetic resources for the future (NELSON, 2018).

Cerasus is a genus of flowering trees and shrubs that includes sour cherries and other species. To cultivate and treat Cerasus germplasm, one should consider the following:

Soil Requirements: Cerasus germplasm requires well-drained, fertile soil with a pH of 6.0 to 7.0.

Climate: Cerasus germplasm grows well in a temperate climate with a cool winter and warm summer.

Planting: Cerasus germplasm is usually propagated by grafting or budding. The plants should be planted in the spring or fall, and the planting hole should be deep enough to accommodate the root system.

Watering: Cerasus germplasm requires regular watering, especially during the growing season. The soil should be kept evenly moist, but not waterlogged (ȘMULEAC ET ALL., 2021).

Fertilization: Cerasus germplasm requires regular fertilization, particularly in the spring before new growth begins. One should use a balanced fertilizer, such as a 10-10-10 or 12-12-12, and follow the manufacturer's instructions for application rates.

Pruning: Cerasus germplasm requires pruning to maintain its shape and promote fruit production. Pit should be pruned in late winter or early spring before new growth begins.

Disease and Pest Control: Cerasus germplasm is susceptible to several diseases and pests, such as cherry leaf spot, powdery mildew, and cherry fruit fly. We should use appropriate fungicides and insecticides as needed.

Harvesting: Cerasus germplasm fruits are usually ready for harvest in late spring or early summer. The fruits should be picked when they are fully ripe but still firm.

Cerasus germplasm can be processed in various ways to make a variety of products. Among the ways of processing Cerasus germplasm, according to our research, we may include:

Canning: Canned cherries are a popular product made from Cerasus germplasm. The cherries are first pitted and then packed into cans with syrup or water. They can be used in a variety of recipes, such as pies, cobblers, and sauces.

Freezing: Cerasus germplasm can be frozen for later use. The cherries should be washed, pitted, and then spread out on a baking sheet in a single layer to freeze. Once frozen, they can be stored in a freezer-safe container for up to six months.

Drying: Cerasus germplasm can also be dried to make dried cherries. The cherries are first pitted and then dried in a dehydrator or oven. Dried cherries can be used as a snack or in baking recipes.

Juicing: Cerasus germplasm can be juiced to make cherry juice. The cherries are first pitted and then processed through a juicer. The juice can be consumed as-is or used as a base for other beverages.

Distilling: Cerasus germplasm can also be used to make cherry brandy. The cherries are fermented with sugar and yeast to create a cherry wine, which is then distilled to create brandy. Cherry brandy can be consumed as-is or used as an ingredient in cocktails.

Jam and Preserves: Cerasus germplasm can be used to make jams and preserves. The cherries are first pitted and then cooked with sugar and pectin to create a thick, spreadable mixture. The jam or preserves can be used as a topping for toast or as an ingredient in baked goods.

Chocolate-Covered Cherries: Cerasus germplasm can also be used to make chocolate-covered cherries. The cherries are first pitted and then dipped in chocolate. The chocolate-covered cherries can be consumed as a snack or used as a dessert ingredient.

Cerasus germplasm is generally well adapted to a wide range of climates, but its growth and fruiting are affected by temperature and moisture conditions. In general, sour cherry trees prefer a temperate climate with cool winters and mild summers.

The ideal temperature range for Cerasus germplasm is between 15°C to 20°C during the growing season. The tree can tolerate temperatures as low as -40°C during the winter dormancy period but can be damaged by late spring frost or very high summer temperatures.

Moisture is also an important factor for Cerasus germplasm growth and fruit production. The tree requires adequate moisture during the growing season but is susceptible to root rot in waterlogged soils. Sour cherry trees prefer well-drained soils that retain moisture without becoming waterlogged.

Cerasus germplasm is well adapted to a wide range of climates, but it prefers a temperate climate with cool winters and mild summers. The tree can tolerate low temperatures during the winter dormancy period but is susceptible to late spring frost and very high summer temperatures. The tree requires adequate moisture during the growing season but is susceptible to root rot in waterlogged soils.

When planting Cerasus germplasm, there are several important factors to consider to ensure optimal growth and fruit production.

Site Selection: Choose a site with well-drained soil, good air circulation, and full sun exposure. Avoid planting in low-lying areas prone to frost pockets, where cold air accumulates and can damage the tree during the winter.

Soil Preparation: the soil has to be prepared by removing weeds and incorporating organic matter into the soil, adding well-rotted manure or compost, which can help improve soil fertility and structure (FOSTER,2017).

Planting Time: The best time to plant Cerasus germplasm is in late winter or early spring before bud break. This allows the tree to establish roots before the onset of summer heat.

Planting Hole: the hole must be twice the diameter of the root ball and deep enough to accommodate the roots, and the graft union above the soil level.

Tree Placement: the tree has to be placed in the hole and backfill with soil, gently tamping the soil to remove air pockets. Water thoroughly to settle the soil around the roots.

Mulching: Mulching has to be done around the tree with a 2 to 3-inch layer of organic mulch, such as wood chips or shredded leaves. This helps to retain moisture, suppress weeds, and regulate soil temperature.

Pruning: the tree must to be pruned so that to remove damaged or crossing branches and to shape the tree for optimal growth and fruit production.

Fertilizing: a balanced fertilizer must be applied, such as 10-10-10, around the base of the tree in early spring before bud break.

In summary, proper site selection, soil preparation, planting time, planting hole, tree placement, mulching, pruning, and fertilizing are essential for successful Cerasus germplasm planting.

Watering is an essential aspect of Cerasus germplasm care, especially during the growing season when the tree is actively growing and producing fruit. Adequate and timely watering can help ensure healthy growth, fruit development, and good yields (ȘMULEAC ET ALL., 2022).

Some important considerations for watering Cerasus germplasm have to be taken into account:

Frequency: the tree has to be watered deeply and infrequently, providing enough water to saturate the soil to a depth of at least 12 inches, so that to avoid frequent shallow watering, as this can lead to shallow root growth.

Timing: water has to be given early in the morning or late in the evening to reduce evaporation loss and avoid watering during the hottest part of the day.

Soil Moisture: soil's moisture has to be checked regularly to determine when to water. The soil should be moist but not waterlogged.

Drought Conditions: During extended periods of drought, it has to be increased watering frequency and duration to ensure the tree has enough water to sustain growth and fruit production.

Mulching: Mulching has to be done around the base of the tree, that can help to retain moisture and reduce water loss through evaporation.

Watering Cerasus germplasm deeply and infrequently, checking soil moisture regularly, watering during the cooler parts of the day, and mulching can help ensure optimal growth and fruit production. During extended periods of drought, increase watering frequency and duration to prevent the tree from becoming water-stressed (ȘMULEAC ET ALL., 2013).

Fertilization is an important aspect of Cerasus germplasm care, as it provides the essential nutrients required for healthy growth and fruit production. Here are some important considerations for fertilizing Cerasus germplasm:

Soil Test: a soil test must be conducted to determine the nutrient status of the soil and to identify any deficiencies that may need to be addressed.

Fertilizer Type: balanced fertilizer may be used, such as 10-10-10 or 20-20-20, that provides equal amounts of nitrogen, phosphorus, and potassium. Alternatively, a fertilizer formulated specifically for fruit trees.

Application Rate: fertilizer must be applied at the recommended rate based on the soil test results and the age of the tree. Generally, younger trees require less fertilizer than mature trees.

Application Time: fertilizer may be applied in early spring before bud break and again in mid to late summer after fruit harvest, but fertilizing late in the season must be avoided, as this can promote late-season growth that is vulnerable to winter injury.

Application Method: fertilizer may be applied evenly around the base of the tree, extending out to the drip line, and water thoroughly to ensure that the fertilizer is taken up by the roots.

Organic Fertilizers: Organic fertilizers, such as compost, manure, or bone meal, can also be used to provide nutrients to Cerasus germplasm. However, these fertilizers may release nutrients more slowly than synthetic fertilizers and may need to be applied in larger quantities.

Basically, fertilizing Cerasus germplasm with a balanced fertilizer at the recommended rate and time can help provide the essential nutrients required for healthy growth and fruit production. Organic fertilizers can also be used, but may need to be applied in larger quantities. Conducting a soil test can help identify any nutrient deficiencies that need to be addressed.

CONCLUSIONS

Concluding a research project on the use of Cerasus germplasma and its importance for sustainable development involves summarizing key findings and providing insights and recommendations.

Genetic Diversity and Resilience:

Cerasus germplasma, comprising various cherry species and cultivars, demonstrates remarkable genetic diversity and resilience. This diversity equips it with the potential to adapt to a range of environmental conditions, making it a valuable asset for sustainable agriculture in a changing climate.

Sustainable Agriculture and Food Security:

The utilization of Cerasus germplasma holds the promise of sustainable agriculture. Its adaptability and capacity to extend the cherry growing season can lead to increased crop yields and enhanced food security. This not only benefits local communities but also supports global efforts to ensure a consistent and nutritious food supply.

Pest and Disease Resistance:

Comparative analyses reveal that Cerasus germplasma often exhibits greater resistance to pests and diseases compared to alternative cherry varieties or traditional farming practices. This resistance reduces the need for chemical inputs and contributes to ecological balance in agricultural systems.

Biodiversity Conservation:

The conservation of Cerasus germplasma is imperative for preserving biodiversity. By safeguarding unique genetic traits and adaptations, we contribute to the long-term health and resilience of ecosystems. The genetic reservoir of cherry species represents an invaluable resource for future generations.

Climate Change Mitigation:

Cerasus germplasma-based cultivation offers a viable strategy for mitigating the impacts of climate change. Its adaptability to adverse climatic conditions can help buffer against the effects of rising temperatures and water scarcity, promoting resilience in agriculture.

Economic Viability and Diversification:

The analysis shows that Cerasus germplasma not only contributes to ecological sustainability but also presents economic opportunities. Cherries, known for their high nutritional value, can be processed into various food products, fostering economic diversification and reducing pressure on land and water resources.

Policy Implications:

The findings have clear policy implications. Policymakers should recognize the significance of Cerasus germplasma in sustainable agriculture and biodiversity conservation. Supporting initiatives that encourage the conservation and utilization of this genetic resource is crucial for the long-term sustainability of agricultural systems.

Community Involvement:

Engaging local communities, farmers, and relevant organizations in the adoption of sustainable cherry cultivation practices is essential. Community involvement enhances the acceptability and practicality of sustainable agricultural methods, benefiting both local livelihoods and environmental conservation.

In conclusion, the research underscores the multifaceted importance of Cerasus germplasma use in contemporary sustainable development. It offers solutions to pressing global challenges, including climate change, biodiversity loss, and food security. By harnessing the potential of this genetic resource, we can contribute to a more sustainable and resilient future, both in agriculture and in our broader ecosystems. The recommendations and insights from this study can guide efforts to promote sustainable cherry cultivation and inform policy decisions aimed at achieving sustainability in agriculture.

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