PYRETHRUM PRODUCTION NICHES AND CLIMATE REQUIREMENTS

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Introduction

Pyrethrum crop is grown for production of pyrethrins which are useful in the formulation of organic insecticides. Flower formation with high pyrethrin content is influenced by the environmental conditions in the growing area alongside good crop management practices.

Production niches in relation to the crop can be defined as the range of resources and conditions enabling the crop to give maximum yields crop in a given geographical location.

Production niches of a crop emanates from the following broad categories of factors. These are:

Climatic requirements of a crop and edaphic requirements

Climatic requirement of a crop denotes all the average weather conditions of a place that favour the growth and full development of a crop.

In Kenya, the ideal conditions for pyrethrum production are spread across areas with cool and wet as well as averagely warm and wet climate. The pyrethrum suitability map shows the areas with ideal climate and soil resources that support pyrethrum production in Kenya.

The climate requirements of a crop vary from: Precipitation, temperature of a place and aspects of light whereas edaphic /soil factors comprise of: Soil depth and fertility conditions, soil pH, soil structure, soil texture and drainage as well as pests and disease status of the soil.

Climatic requirements.

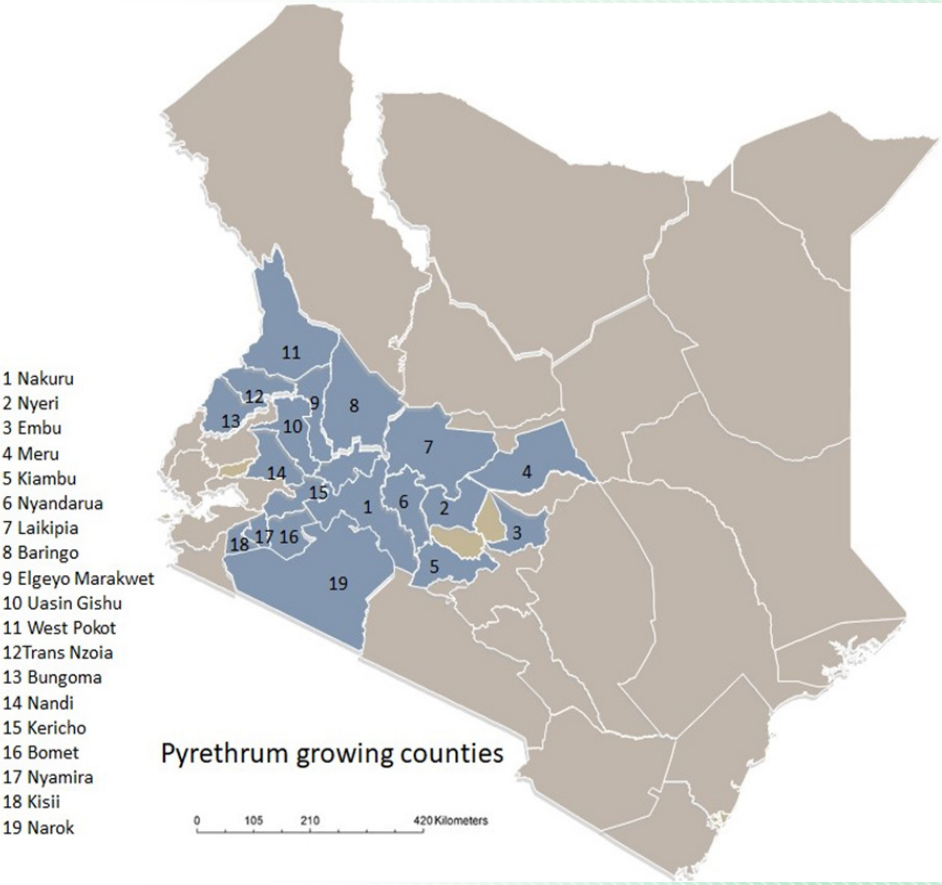
i. Rainfall and water requirement

Pyrethrum requires a minimum of 750 mm (30 inches) of rainfall well spread over the cropping season. In warmer areas, where evaporation is high, precipitation of 1000 to 1125 mm (40 to 45 inches) that is well distributed throughout the season is preferable. Excessive rains in poorly drained soils are known to encourage root rot disease due to waterlogging.

In cases of erratic rainfall, farmers are advised to irrigate so as to minimize moisture stresses in plants.

ii. Altitude: In Kenya, available pyrethrum clones and varieties are suitable for different altitudes. These are classified based on the altitudes where they thrive well; high altitude of above 2200 meters, medium altitude areas of between 1800-2200 meters above the sea level and for low altitudes below 1800 meters above sea level.

iii. Temperature: The pyrethrin content is affected by changes in



Pyrethrum suitability map

temperatures. Generally, when the mean temperature falls, the content rises. Pyrethrum requires a temperature of less than 18° C for at least 6 weeks in order to initiate flowering. This process is known as vernalisation.

iv. **Aspects of light:** These includes the factors of light in relation to photosynthesis. They are light intensity, light wavelength and light duration.

- ***Light intensity:*** Light intensity is the measurement of how much solar energy is falling on the leaf surface. Light intensity influences photosynthesis, stem elongation length and flowering. Pyrethrum requires a moderate level of light intensity to produce high-quality flowers. Areas with

Overhead irrigation of pyrethrum during dry season of the year.

too much shade or prolonged overcast can negatively affect the crop.

- ***Light wavelength:*** This is the measurement of light quality accessible by the plant chloroplast tissues. For photosynthesis, plants use light in the PAR (photosynthetic active radiation) region of wavelengths ranging between 400 nm - 700 nm. Most pyrethrum growing regions are found around the equator where sun shines for a better part of the year. This guarantees ideal light quality needed by the pyrethrum crop.

- ***Light duration:*** Light duration is the measurement of how many hours of sunshine experienced in a day. Plants can be broadly classified into three major classes namely: Long day pants, day neutral plant and short day plants. Pyrethrum being a long day plant requires more hours of sunshine in a day for photosynthesis to take place fully and flowers to open.

1. Edaphic/ Soil requirements

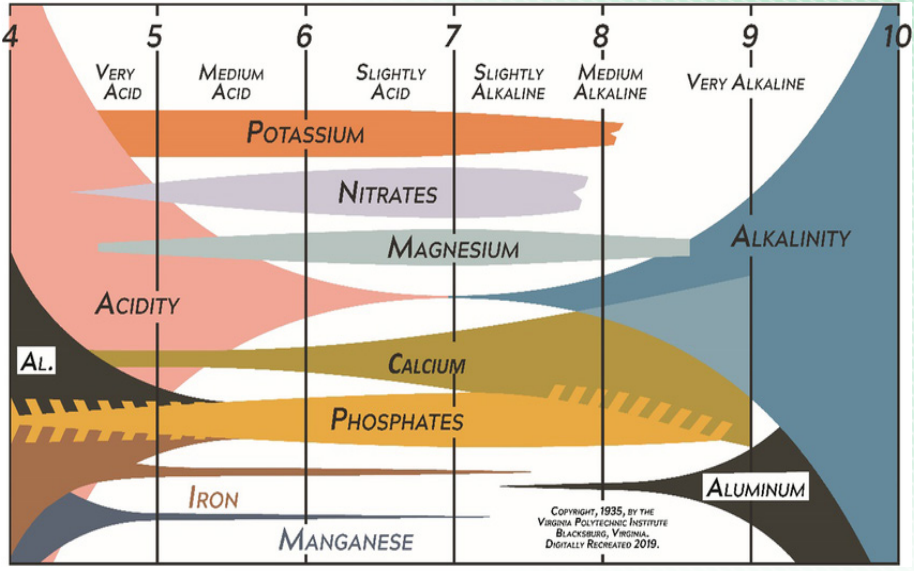
These are plant requirements derived from the soil environment or the rhizosphere zones of the plant roots. They include:

i. ***Soil depth and fertility:*** Pyrethrum crop prefers soils that are fertile, deep with high ability to supply plant nutrients. Fertile soils rich in macro-elements such as phosphorus, calcium and magnesium as well as micro elements like Zinc and Boron are ideal for crop growth.

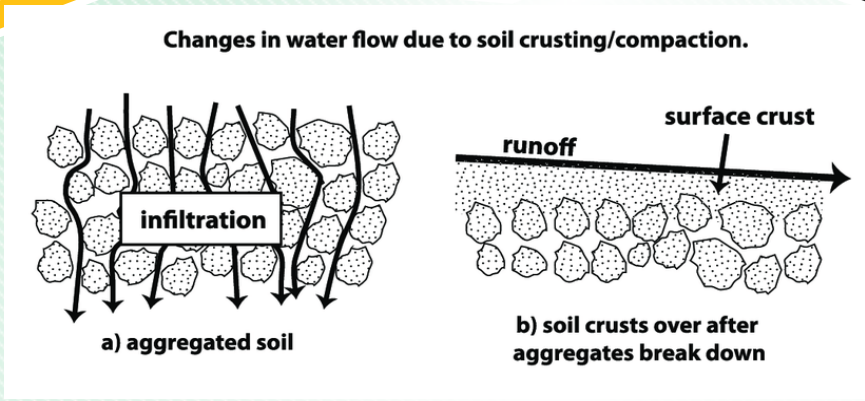
ii. ***Soil pH:*** Soil *pH* is a function of Hydrogen Ion (H^+) concentration present in the soil solution. Based on this, the soil can either be acidic, basic or alkaline. For pyrethrum, the ideal Soil pH should range between 5.0 – 6.5, as pH extremes either very acidic or very alkaline are deemed detrimental to root formation and flower production.

Findings of the soil sampling process helps to guide farmers on corrective measure to apply.

iii. ***Good soil structure:*** Good soil structure ensures proper water infiltration and controls erosion. Structure and texture of soils frequently damaged by poor farming practices like repeated weeding and trampling. Such soils require rehabilitation by addition of organic matter in the form of the farmyard manure or compost manure. When fully decomposed organic matter is incorporated into the soil, there will be an improvement in both the chemical and physical properties of the soil.



Distribution of Minerals in different soil pH ranges



Effects of soil structure on water percolation

iv. Soil drainage and texture: Well drained soils with reasonably good texture are ideal for pyrethrum production. Consequently, poorly drained soils are prone to waterlogging and surface runoff hence not ideal for pyrethrum production. This is because pyrethrum crop is very sensitive to poorly drained soils due to root damage by marshy conditions. Farmers are always advised to incorporate well decomposed manures into the soil to deal with this menace.

v. Freedom from soil borne pests and diseases: Ideal soil for pyrethrum production should be free from soil borne pests and diseases. Pyrethrum as a perennial crop has a cropping season of about 4 years hence soil borne

Root tissues severely damaged by root knot nematodes

pest and diseases may cause a lot of crop damage if not well managed. It is therefore advisable that farmers need to observe integrated pests and disease management practices.

Common safety measures in addressing this issue are: soil testing before crop establishment, crop rotation, weed control and avoiding fields previously occupied by crops that share same pests and diseases as pyrethrum.

Mole is a destructive field pest for pyrethrum

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KALRO/NAVCDP/Pamphlet No. 105/2024