

RINGKASAN

NORMAWATI, Program Studi Agronomi Fakultas Pertanian, Universitas Jenderal Soedirman, Karakter Jewawut Pada Kondisi Salin, Ketua: Ahadiyat Yugi Rahayu, S.P., M.Si.,D.Tech.Sc, Anggota: Prof. Ir. Totok Agung Dwi Haryanto., M.P.,Ph.D.

Peningkatan jumlah penduduk di Indonesia sangat signifikan, hal ini dihubungkan dengan meningkatnya kebutuhan pangan dan energi. Jewawut (*Setaria italica* (L.) P. Beauv) merupakan tanaman yang tersebar diberbagai daerah di Indonesia. Jewawut memiliki potensi dalam mendukung pengembangan diversifikasi pangan karena memiliki kandungan gizi dan serat yang hampir setara dengan beras dan sebagai bahan baku dalam pembuatan biofuel yaitu bioetanol. Lahan salin tersebar luas di Indonesia terutama di wilayah sepanjang pantai dan menjadi masalah utama dalam bidang pertanian. Upaya dilakukan guna meningkatkan efektivitas lahan salin sebagai lahan budidaya pertanian melalui teknik budidaya yang tepat pada tanaman jewawut. Penelitian karakter tanaman jewawut pada kondisi salin bertujuan mengetahui respon benih dimedia salin terhadap viabilitas dan fisiologi kecambah, adaptasi morfologi bibit, serta mengetahui pengaruh perbedaan dosis pupuk N, P, K dan bahan organik eceng gondok terhadap karakter pertumbuhan, fisiologi dan hasil tanaman jewawut di lahan salin pesisir pantai. Penelitian telah dilaksanakan dalam skala laboratorium pada fase perkecambahan dan secara eksperimental pada fase bibit dan tanaman, di Desa Bunton, Kecamatan Adipala, Kabupaten Cilacap. Penelitian dilaksanakan pada bulan Mei 2019 hingga April 2020.

Penelitian pada fase perkecambahan benih jewawut pada kondisi salin menggunakan Rancangan Acak Lengkap (RAL) dengan 3 taraf perlakuan media salin dan 3 kali ulangan (3x3). Tiap ulangan terdiri atas 3 unit cawan petri berisi 150 benih jewawut. Perlakuan 3 taraf media salin yaitu $N_0 = 0$ mS/cm, $N_1 = 0,21$ mS/cm dan $N_2 = 2$ mS/cm. Hasil analisis ragam media salin 0,21 mS/cm berpengaruh nyata pada penurunan panjang hipokotil 8 HSS. Media salin 2 mS/cm berpengaruh nyata pada penurunan panjang kecambah 8 HSS, panjang radikula 8 HSS serta peningkatan kandungan asam askorbat 8 HSS dan kandungan protein 8 HSS. Media salin 2 mS/cm berpengaruh sangat nyata pada penurunan persentase potensi tumbuh maksimum 8 HSS dan indeks vigor 5 HSS. Seluruh parameter pengamatan dengan hasil lebih baik pada konsentrasi NaCl 0 mS/cm. Pada media salin dengan konsentrasi NaCl 0,21 mS/cm dan 2 mS/cm memberi hasil lebih rendah dan mengindikasikan perkecambahan benih sangat peka terhadap salinitas.

Pengamatan penelitian bibit dilaksanakan secara deskripsi melalui kategori morfologi bibit jewawut umur satu bulan atau 4 MSS berdasarkan karakter pertumbuhan yaitu tinggi bibit, panjang daun, jumlah daun, diameter batang dan kehijauan daun. Produksi tanaman jewawut di lahan salin pesisir pantai melalui aplikasi dosis pupuk N, P, K dan bahan organik eceng gondok dengan tahapan deskripsi kategori morfologi bibit, pengamatan karakter pertumbuhan, fisiologi dan hasil dengan pengaplikasian dosis pupuk N, P, K dan bahan organik eceng gondok. Penelitian menggunakan Rancangan Acak Kelompok Lengkap (RAKL) dengan 2 faktor yaitu 4 taraf dosis pupuk N, P, K dan 3 taraf dosis bahan organik dan diulang

sebanyak 4 kali. Faktor pertama adalah dosis pupuk N, P, K yaitu 25% (34,5 kg N/ha, 13,5 kg P₂O₅/ha, 11,25 kg K₂O/ha), 50% (69 kg N/ha, 27 kg P₂O₅/ha, 22,5 kg K₂O/ha), 75% (103,5 kg N/ha, 40,5 kg P₂O₅/ha, 33,75 kg K₂O/ha) dan 100% (138 kg N/ha, 54 kg P₂O₅/ha, 45 kg K₂O/ha). Faktor kedua terdiri atas 3 taraf yaitu 0 kg/ha, 1.500 kg/ha (1,0125 kg/plot) dan 2.500 kg/ha (1,688 kg/plot).

Hasil pengamatan karakter morfologi bibit menghasilkan tiga kategori yaitu Baik, Cukup Baik dan Kurang Baik pada tinggi bibit, panjang daun, jumlah daun, diameter batang, dan kehijauan daun. Hasil analisis ragam pada karakter pertumbuhan melalui aplikasi dosis pupuk N, P, K 50% berpengaruh nyata pada peningkatan tinggi tanaman 4 MST, jumlah daun 4 MST dan berpengaruh sangat nyata pada peningkatan jumlah daun umur 2 MST. Dosis bahan organik 2.500 kg/ha berpengaruh nyata pada peningkatan tinggi tanaman umur 6 MST. Dosis pupuk N, P, K 50% berpengaruh nyata dan dosis bahan organik 2.500 kg/ha berpengaruh sangat nyata pada peningkatan jumlah daun 6 MST. Pengaplikasian dosis pupuk N, P, K, dosis bahan organik dan kombinasi dosis pupuk N, P, K dan bahan organik tidak berpengaruh nyata pada peningkatan total panjang akar 2 MST, bobot akar kering 2 MST, bobot tajuk kering 2 MST, luas daun, bobot akar kering akhir dan bobot tajuk kering akhir.

Hasil analisis ragam pada karakter fisiologi, dosis pupuk N, P, K 50% berpengaruh nyata pada peningkatan kerapatan stomata, kombinasi dosis pupuk N, P, K 25% dan bahan organik 2.500 kg/ha berpengaruh sangat nyata pada peningkatan klorofil a, kombinasi dosis pupuk N, P, K 100% dan bahan organik 1.500 kg/ha berpengaruh sangat nyata pada peningkat klorofil b dan klorofil total, kombinasi dosis pupuk N, P, K 25% dan bahan organik 0 kg/ha berpengaruh nyata pada peningkatan kandungan prolin. Pada karakter hasil dengan dosis pupuk N, P, K, dosis bahan organik serta kombiasi dosis pupuk N, P, K dan bahan organik tidak berpengaruh nyata pada umur berbunga, umur panen dan bobot malai. Aplikasi dosis pupuk N, P, K 50% dan dosis bahan organik 2.500 kg/ha berpengaruh nyata pada peningkatan panjang malai.

Kondisi salin berdampak pada karakter pertumbuhan, morfologi, fisiologi dan hasil terhadap perkecambahan benih, bibit dan tanaman jiwawut di lahan salin pesisir pantai. Media salin mempengaruhi semua parameter pengamatan dengan hasil lebih tinggi dan lebih baik pada konsentrasi 0 mS/cm dibanding 0,21 mS/cm dan 2 mS/cm pada fase perkecambahan yang menunjukkan sangat peka terhadap salinitas. Pengaplikasian dosis N, P, K 100% mempengaruhi fisiologi, dosis pupuk N, P, K 50% mempengaruhi pertumbuhan dan hasil tanaman jiwawut. Dosis bahan organik tidak mempengaruhi tinggi tanaman 2 MST, tinggi tanaman 4 MST, jumlah daun 2 MST, jumlah daun 4 MST, luas daun, total panjang akar, bobot akar kering 2 MST, bobot akar kering akhir, bobot tajuk kering 2 MST, bobot tajuk kering akhir, kerapatan stomata, umur berbunga, umur panen dan bobot malai. Kombinasi dosis pupuk N, P, K dan bahan organik mempengaruhi tinggi tanaman 4 MST, jumlah daun 2 MST, jumlah daun 4 MST, klorofil a, klorofil b, klorofil total, prolin dan panjang malai. Terbatasnya unsur hara, intensitas penyinaran, suhu, curah hujan dan kecepatan angin mempengaruhi pertumbuhan tanaman jiwawut. Dosis bahan organik pada beberapa karakter tidak berpengaruh karena proses dekomposisi bahan organik membutuhkan waktu tertentu.

SUMMARY

*The increase in population in Indonesia is very significant, this is related to the increasing need for food and energy. Foxtail millet (*Setaria italica* (L.) P. Beauv) is a plant that is spread in various regions in Indonesia. Foxtail millet has the potential to support the development of food diversification because it contains nutrients and fiber which are almost equivalent to rice and as raw materials in the manufacture of biofuels, namely bioethanol. Saline soil is widespread in Indonesia, especially along the coast and is a major problem in agriculture. Efforts were made to increase the effectiveness of saline soil as agricultural cultivation soil through proper cultivation techniques for foxtail millet plants. Research on the character of foxtail millet plants in saline conditions aims to determine the response of seeds in saline media to viability and physiology of sprouts, adaptation of seed morphology, and to determine the effect of different doses of N, P, K fertilizers and water hyacinth organic matter on growth characters, physiology and yield of foxtail millet in the coastal saline soil. The research was carried out on a laboratory scale in the germination phase and experimentally in the seed and plant phase, in Bunton Village, Adipala District, Cilacap Regency. The research was carried out from May 2019 to April 2020.*

Research on the germination phase of foxtail millet seeds in saline conditions used a Completely Randomized Design (CRD) with 3 treatment levels of saline media and 3 replications (3x3). Each replication consisted of 3 units of petri dishes containing 150 foxtail millet seeds. The treatments for 3 levels of saline media were $N_0 = 0$ mS/cm, $N_1 = 0.21$ mS/cm and $N_2 = 2$ mS/cm. The results of the analysis of the variety of saline media 0.21 mS/cm significantly affected the reduction in the length of the 8 day after seedlings hypocotyl. The 2 mS/cm saline medium had a significant effect on decreasing the length of 8 day after seedlings sprouts, 8 day after seedlings radicle lengths and increasing the content of 8 day after seedlings ascorbic acid and 8 day after seedlings protein content. The 2 mS/cm saline medium had a very significant effect on the decrease in the percentage of the maximum growth potential of 8 day after seedlings and 5 day after seedlings vigor index. All observed parameters with better results at 0 mS/cm NaCl concentration. In saline media with NaCl concentrations of 0.21 mS/cm and 2 mS/cm gave lower yields and indicated that seed germination was very sensitive to salinity.

Seed research observations were carried out descriptively through the morphological category of one month old foxtail millet seedlings or 4 day after seedlings based on growth characters, namely seed height, leaf length, number of leaves, stem diameter and leaf greenness. Production of foxtail millet plants in coastal saline soils through the application of N, P, K fertilizer doses and water hyacinth organic matter with descriptions of seed morphological categories, observation of growth character, physiology and yield by applying doses of N, P, K fertilizers and water hyacinth organic matter. The study used a Randomized Complete Block Design (RCBD) with 2 factors, namely 4 levels of fertilizer N, P, K and 3 levels of doses of organic matter and repeated 4 times. The first factor is the dose of fertilizer N, P, K, namely 25% (34.5 kg N/ha, 13.5 kg P_2O_5 /ha, 11.25 kg K_2O /ha), 50% (69 kg N/ha, 27 kg P_2O_5 /ha, 22.5 kg K_2O /ha), 75% (103.5 kg N/ha,

40.5 kg P₂O₅/ha, 33.75 kg K₂O/ha) and 100% (138 kg N/ha, 54 kg P₂O₅/ha, 45 kg K₂O/ha). The second factor consists of 3 levels, namely 0 kg/ha, 1,500 kg/ha (1.0125 kg/plot) and 2,500 kg/ha (1.688 kg/plot).

The results of observations of the morphological characters of the seeds resulted in three categories, namely Good, Fairly Good and Bad on seed height, leaf length, number of leaves, stem diameter, and leaf greenness. The results of the analysis of variance on growth characters through the application of fertilizers N, P, K 50% had a significant effect on the increase in plant height 4 WAP, leaf number 4 WAP and had a very significant effect on increasing the number of leaves aged 2 WAP. The dosage of organic matter 2,500 kg/ha had a significant effect on the increase in plant height at 6 WAP. Doses of N, P, K 50% had a significant effect and the dosage of organic matter was 2,500 kg / ha had a very significant effect on the increase in the number of leaves 6 WAP. The application of N, P, K doses, the dosage of organic matter and the combination of fertilizer N, P, K and organic matter doses did not significantly affect the increase in total root length of 2 WAP, dry root weight of 2 WAP, dry shoot weight of 2 WAP, leaf area, final dry root weight and final dry crown weight.

The results of analysis of variance on physiological characters, the dose of fertilizer N, P, K 50% significantly affected the increase in stomatal density, the combination of N, P, K 25% and organic matter 2,500 kg/ha had a very significant effect on the increase in chlorophyll a, the dose combination 100% N, P, K fertilizers and 1,500 kg/ha organic matter had a very significant effect on the increase in chlorophyll b and total chlorophyll, the combination of fertilizer doses N, P, K 25% and organic matter 0 kg/ha had a significant effect on increasing proline content. The yield characters with N, P, K doses, organic matter doses and combination of N, P, K and organic matter did not significantly affect flowering age, harvest age and panicle weight. Application of N, P, K dose 50% and organic matter dosage 2,500 kg/ha had a significant effect on increasing panicle length.

Saline conditions have an impact on the character of growth, morphology, physiology and yield on the germination of seeds, seeds and foxtail millet plants in coastal saline soils. Saline media affected all the observed parameters with higher and better results at a concentration of 0 mS/cm compared to 0.21 mS/cm and 2 mS/cm in the germination phase which showed very sensitivity to salinity. The application of 100% N, P, K doses affected physiology, 50% N, P, K doses affected the growth and yield of foxtail millet. The dosage of organic matter did not affect plant height 2 WAP, plant height 4 WAP, leaf number 2 WAP, number of leaves 4 WAP, leaf area, total root length, dry root weight of 2 WAP, final dry root weight, 2 WAP dry shoot weight, final dry crown, stomata density, flowering age, harvest age and panicle weight. The combination of N, P, K doses and organic matter affected plant height 4 WAP, leaf number 2 WAP, leaf number 4 WAP, chlorophyll a, chlorophyll b, total chlorophyll, proline and panicle length. Limited nutrients, intensity of irradiation, temperature, rainfall and wind speed affect the growth of foxtail millet plants. The dosage of organic matter in some characters has no effect because the process of decomposing organic matter takes a certain time.