RINGKASAN

Pemilihan jenis alat dan mesin pengolah tanah sangat penting dilakukan agar mendapatkan hasil yang optimal dan efisien. Salah satu faktor yang perlu diperhatikan dalam pemilihan jenis alat dan mesin pengolah tanah adalah daya traktor dan jenis implemen. Dalam hal ini daya traktor sangat erat hubungannya dengan tingkat konsumsi bahan bakar. Meskipun demikian, kajian mengenai pengaruh perbedaan jenis alat dan mesin pengolah tanah terhadap tingkat konsumsi bahan bakar selama proses pengolahan tanah masih belum banyak dilakukan. Oleh karena itu, penelitian ini bertujuan untuk: (1) mengetahui pengaruh perbedaan alat dan mesin pengolahan tanah terhadap tingkat konsumsi bahan bakar selama proses pengolahan tanah, (2) mengetahui pengaruh waktu total, waktu belok, kapasitas lapang efektif, kapasitas lapang teoritis, dan efisiensi lapang terhadap tingkat konsumsi bahan bakar.

Penelitan ini dilaksanakan pada bulan Januari hingga Maret 2024 di Unit Pelaksanaan Teknis Daerah Balai Benih Laboratorium Pertanian, Kabupaten Banjarnegara, Provinsi Jawa Tengah. Penelitian ini menggunakan Rancangan Acak Lengkap (RAL) 1 faktorial, faktor yang digunakan yaitu perbedaan alat dan mesin pengolahan tanah. Variabel yang diamati pada penelitian ini adalah: tingkat konsumsi bahan bakar, total waktu pengolahan tanah, waktu belok pengolahan tanah, kapasitas lapang teoritis, kapasitas lapang efektif, dan efisiensi lapang. Alat yang digunakan pada penelitian ini yaitu: *rotary power tiller*, traktor roda 4 dengan bajak singkal, dan traktor roda 4 dengan bajak *rotary.* Bahan yang digunakan pada penelitian ini yaitu: bahan bakar solar, 3 petakan lahan yang memiliki lebar 10 m, dan panjang 35 m. Pengambilan data dilakukan dengan 30 ulangan untuk setiap perlakuan, sehingga diperoleh total 90 data.

Hasil penelitian menunjukkan bahwa perbedaan jenis alat dan mesin pengolah tanah berpengaruh nyata ($p<0,05$) terhadap tingkat konsumsi bahan bakar, dimana terendah *rotary power tiller* (3,607 l/ha dan 0,650 l/jam), selanjutnya traktor roda 4 dengan bajak singkal (14,112 l/ha dan 3,396 l/jam), dan tertinggi traktor roda 4 dengan bajak *rotary* (25,440 l/ha dan 6,831 l/jam). Untuk nilai kapasitas lapang efektif dan kapasitas lapang teoritis terendah pada *rotary power tiller,* selanjutnya traktor roda 4 dengan bajak singkal, dan tertinggi traktor roda 4 dengan bajak *rotary.* Nilai waktu total pengolahan tanah dan efisiensi lapang terendah pada traktor roda 4 dengan bajak *rotary,* selanjutnya traktor roda 4 dengan bajak singkal, dan tertinggi *rotary power tiller,* sedangkan nilai waktu belok pengolahan tanah terendah pada traktor roda 4 dengan bajak *rotary,* selanjutnya *rotary power tiller,* dan tertinggi pada traktor roda 4 dengan bajak singkal. Hubungan antar variabel perlakuan menunjukkan adanya kecenderungan dimana semakin tinggi waktu total maupun waktu belok pengolahan tanah maka konsumsi bahan bakar akan semakin meningkat, sedangkan semakin besar nilai kapasitas lapang efektif, kapasitas lapang teoritis, dan efisiensi lapang maka konsumsi bahan bakar akan semakin kecil.

SUMMARY

Choosing the type of land processing tools and machines is very important to get optimal and efficient results. One of the factors that need to be considered in selecting the type of land processing equipment and machinery is the tractor power and type of implement. In this case, the tractor power is closely related to the level of fuel consumption. However, there have not been many studies regarding the influence of different types of soil processing tools and machines on the level of fuel consumption during the soil processing process. Therefore, this research aims to: (1) determine the effect of different tillage tools and machines on the level of fuel consumption during the tillage process, (2) determine the effect of total time, turning time, effective field capacity, theoretical field capacity, and field efficiency on fuel consumption levels.

This research was carried out from January to March 2024 at the Regional Technical Implementation Unit of the Agricultural Laboratory Seed Center, Banjarnegara Regency, Central Java Province. This research used a 1 factorial Completely Randomized Design (CRD), the factors used were differences in land processing tools and machines. The variables observed in this research were: fuel consumption level, total tillage time, tillage turning time, theoretical field capacity, effective field capacity, and field efficiency. The tools used in this research are: rotary power tiller, 4-wheeled tractor with single plow, and 4-wheeled tractor with rotary plow. The materials used in this research were: diesel fuel, 3 plots of land 10 m wide and 35 m long. Data collection was carried out with 30 repetitions for each treatment, so that a total of 90 data were obtained.

The results of the research show that different types of tools and land processing machines have a significant effect ($p<0.05$) on the level of fuel consumption, with the lowest being a rotary power tiller (3.607 l/ha and 0.650 l/hour), followed by a 4-wheeled tractor with a single plow. (14,112 l/ha and 3,396 l/hour), and the highest 4-wheeled tractor with rotary plow (25,440 l/ha and 6,831 l/hour). For effective field capacity and theoretical field capacity values, the lowest is for a rotary power tiller, next is a 4-wheeled tractor with a single plow, and the highest is a 4-wheeled tractor with a rotary plow. The lowest value of total tillage time and field efficiency was for a 4-wheeled tractor with a rotary plow, then a 4-wheeled tractor with a single plow, and the highest for a rotary power tiller, while the lowest tillage turning time value was for a 4-wheeled tractor with a rotary plow, then a rotary power tiller, and highest on 4-wheeled tractors with single plows. The relationship between treatment variables shows a tendency where the higher the total time and turning time for tillage, the fuel consumption will increase, while the greater the value of effective field capacity, theoretical field capacity and field efficiency, the smaller the fuel consumption will be.