EFFECTS OF LOG SOURCE, STRAIN, LOG DIAMETER AND FELLING PERIOD ON SHIITAKE PRODUCTION

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Rationale

Why shiitake production?

- ✓Shiitake as medicinal gourmet
- ✓Commands high price ((US $10-20/kg fresh) compared to almost half less for other cultured mushrooms
- ✓Alternative livelihood among forest dwellers while curbing deforestation.
- ✓Can be instrument integrated into existing agro-forestry systems while addressing resilience and sustainability.

Do we favor forest clearing (A) to give way for chayote production (B)?

Or make use of pruned logs from shade trees of coffee to produce gourmet shiitake and motivate planting trees as substrate source?

Materials and Methods

Log felling

Drilling

Pure culturing

Spawn making

Spawning

Wax Sealing

Log Incubating

Log incubation

Log laying

Log soaking

Experimental lay out

Fruiting

Data gathering

Results

1. Effect of log substrate source

Of the six native coppicing tree species that produced shiitake fruits, Pangnan (*Lithocarpus bennetii (Miq) Rehder*) produced the highest fruit weight, biological efficiency (BE) and returns on cash expense (ROCE) (Table 1; Plates 1.1 -1.5).

Conversely, Bagaybayen (*Radermachera sp*.) had the least yield and greatest negative BE and ROCE.

Table 1. Shiitake fruit weight, biological efficiency and ROCE from six log sources

TREAT-MENT	TREE SPECIES	FRUIT WEIGHT (kg log^{-1})	BE (%)	ROCE (%)
T1	Tikdog (*Lithocapus wodii*)	**0.98**	**20.7**	**142.05**
T2	Pangnan (*Lithocarpus bennetii (Miq) Rehder*)	**1.40**	**22 .6**	**245.79**
T3	Manggarasiki (*Lithocarpus ovals (Blanco)*	**0.88**	**22.3**	**117.35**
T4	Malabanti (*Humalanthus populneus*(*Geiseler*) *Pax)*	**0.28**	**5.0**	**-30.84**
T5	**Dapdapong (Unidentified)**	**0.34**	**13.6**	**-16.02**
T6	Bagaybayen (*Radermachera sp*.	**0.18**	**5.5**	**-55.54**

Plate 1.1. (Tikdog)

Plate 1.2. (Pangnan)

Plate 1.3. Manggarasiki

Plate 1.5. (Dapdapong)

Plate 1.4 .Malabalanti

2. Effect of shiitake strain on yield

Among the five strains, *L. edodes* 02 produced the highest shiitake yield both on oak (Fig. 2a) and on *Alnus* (Fig. 2b), BE and ROCE (Table 2; Plates 2.1 – 2.5).

Fig. 2.a. Yield (kg log^{-1}) of five shiitake strains on Oak (*L. bennetii*)

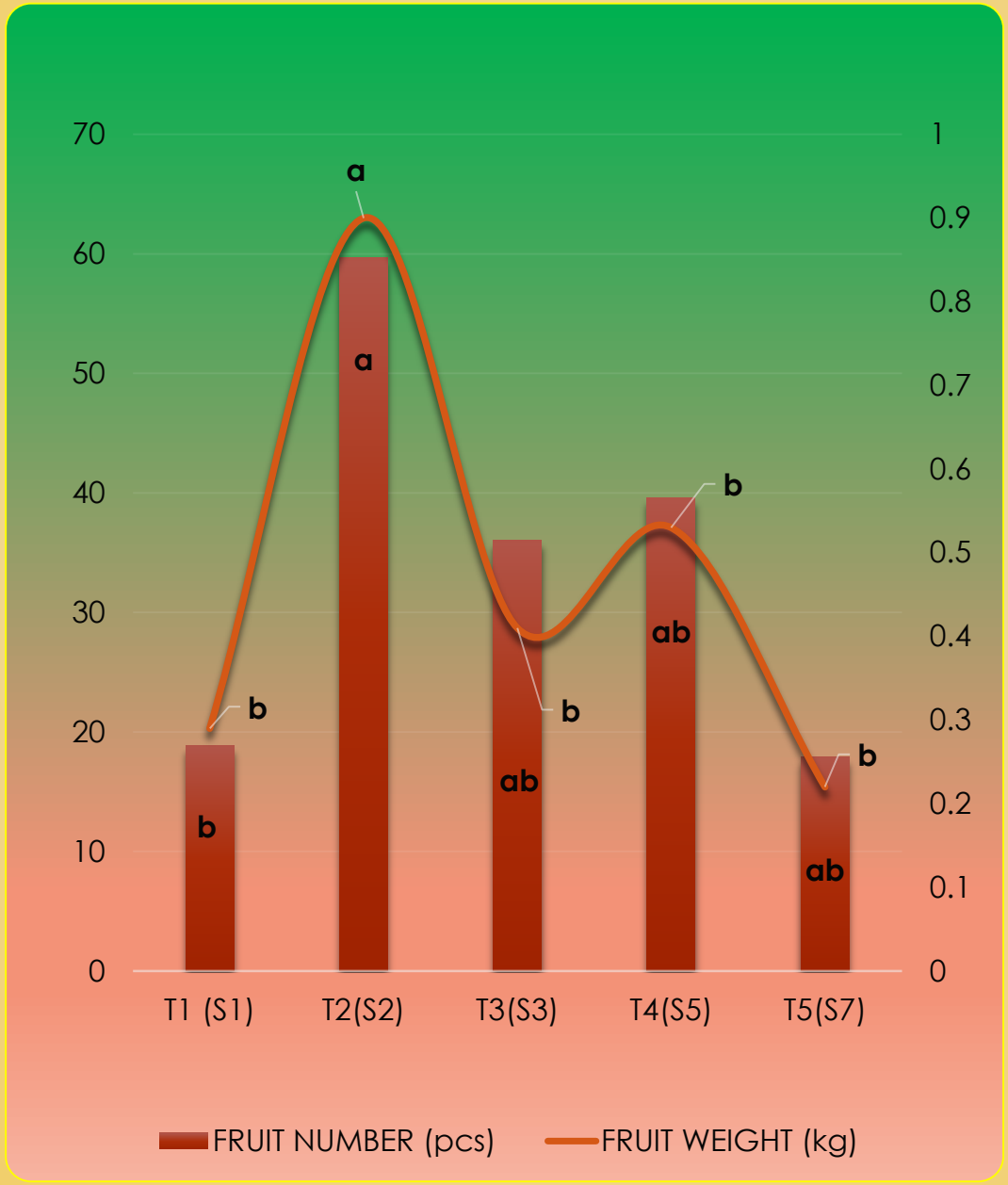

Fig.2.b. Yield (kg log^{-1}) of six shiitake strains on *Alnus japonica*

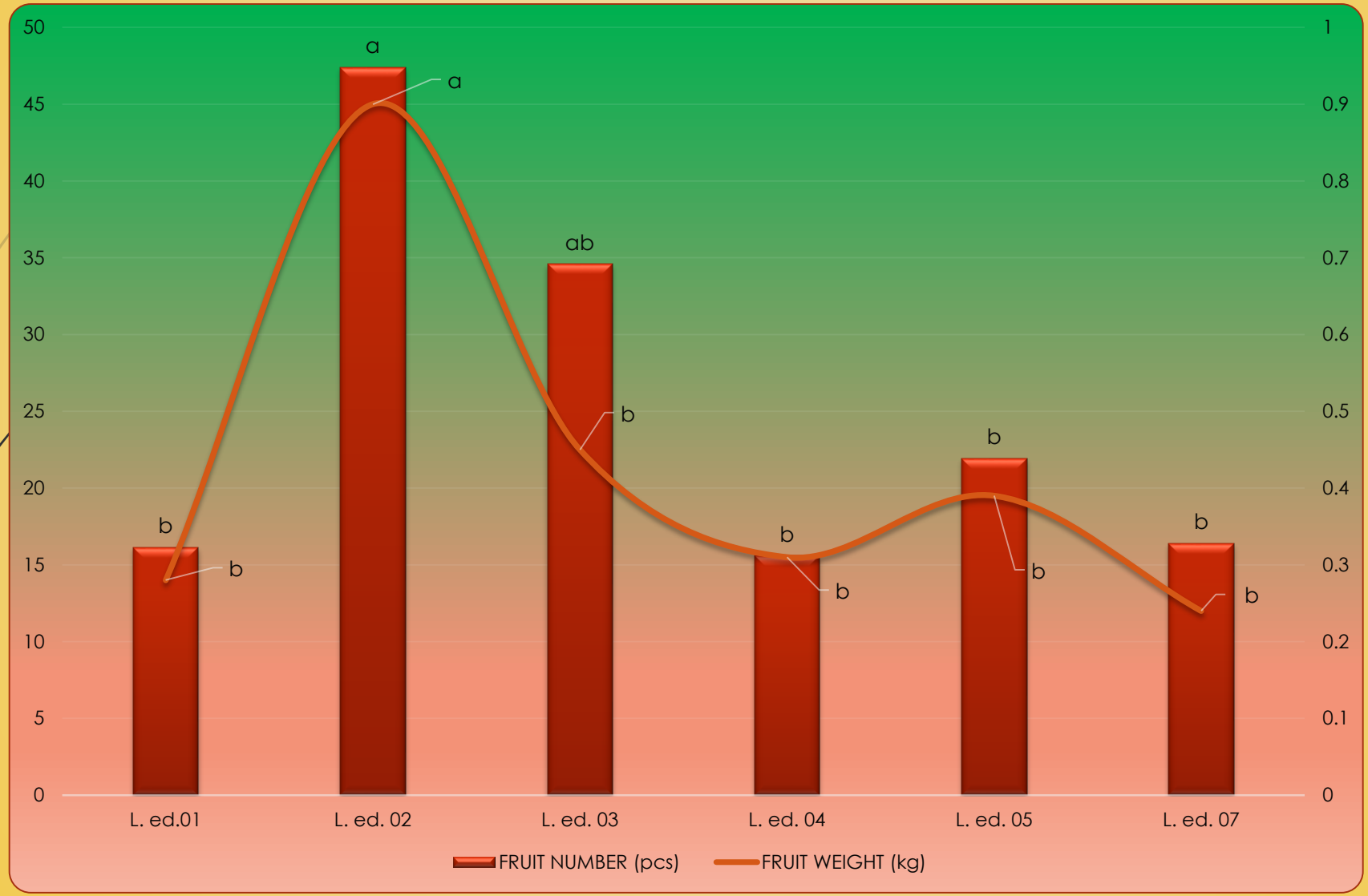

Table 2.a. Fruit weight, BE and ROCE of five Shiitake strains

TREAT-MENT	STRAIN	FRUIT WEIGHT (kg log^{-1})	BE (%)	ROCE (%)
T1 (S1)	*L. edodes* 01	0.29	10.76	-28.37
T2(S2)	*L. edodes* 02	0.90	34.38	122.29
T3(S3)	*L. edodes* 03	0.41	3.96	1.27
T4(S5)	*L. edodes* 05	0.53	10.29	30.90
T5(S7)	*L. edodes* 07	0.22	4.46	-45.66
CV (%)		8.90		

Plate 2.1. Shiitake fruit from *L. edodes* 01

Plate 2.2. Shiitake fruit from *L. edodes* 02

Plate 2.3. Shiitake fruit from *L. edodes* 03

Plate 2.4.Shiitake fruit from *L. edodes* 05

Plate 2.5. Shiitake fruits from S. *L. edodes* 07

3. Effect of log diameter on yield of shiitake strains

Oak logs of 10 -15 cm diameter produce the high yield and consequently the high BE (Fig. 3.1).

Alnus logs of *20* cm log diameter produce the highest yield (Fig. 3.2) and consequently the highest BE and ROCE (Table 3).

Fig. 3. 1. Shiitake yield from four oak log diameters

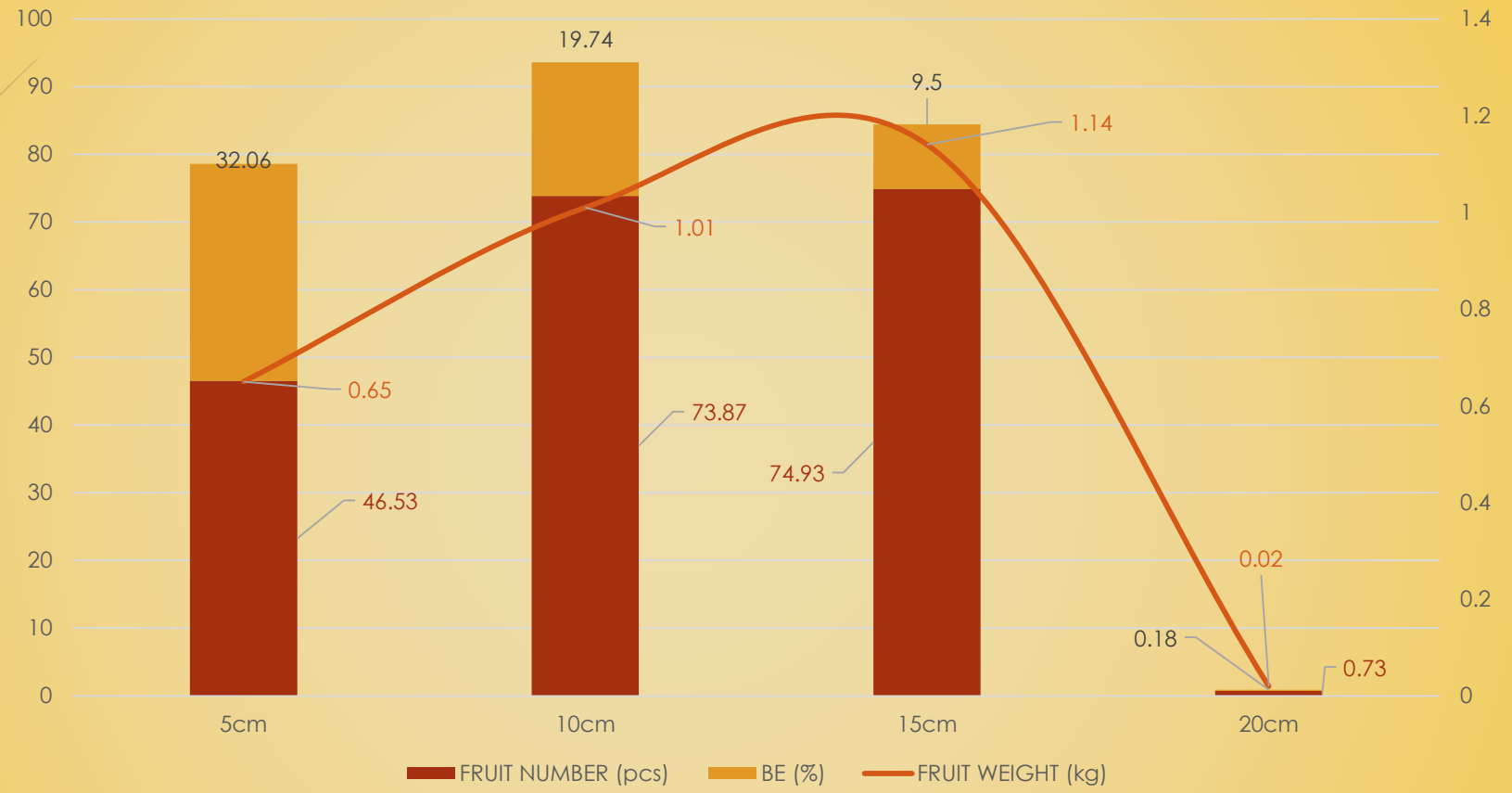

Fig. 3. 2. Shiitake yield from four *Alnus* log diameters

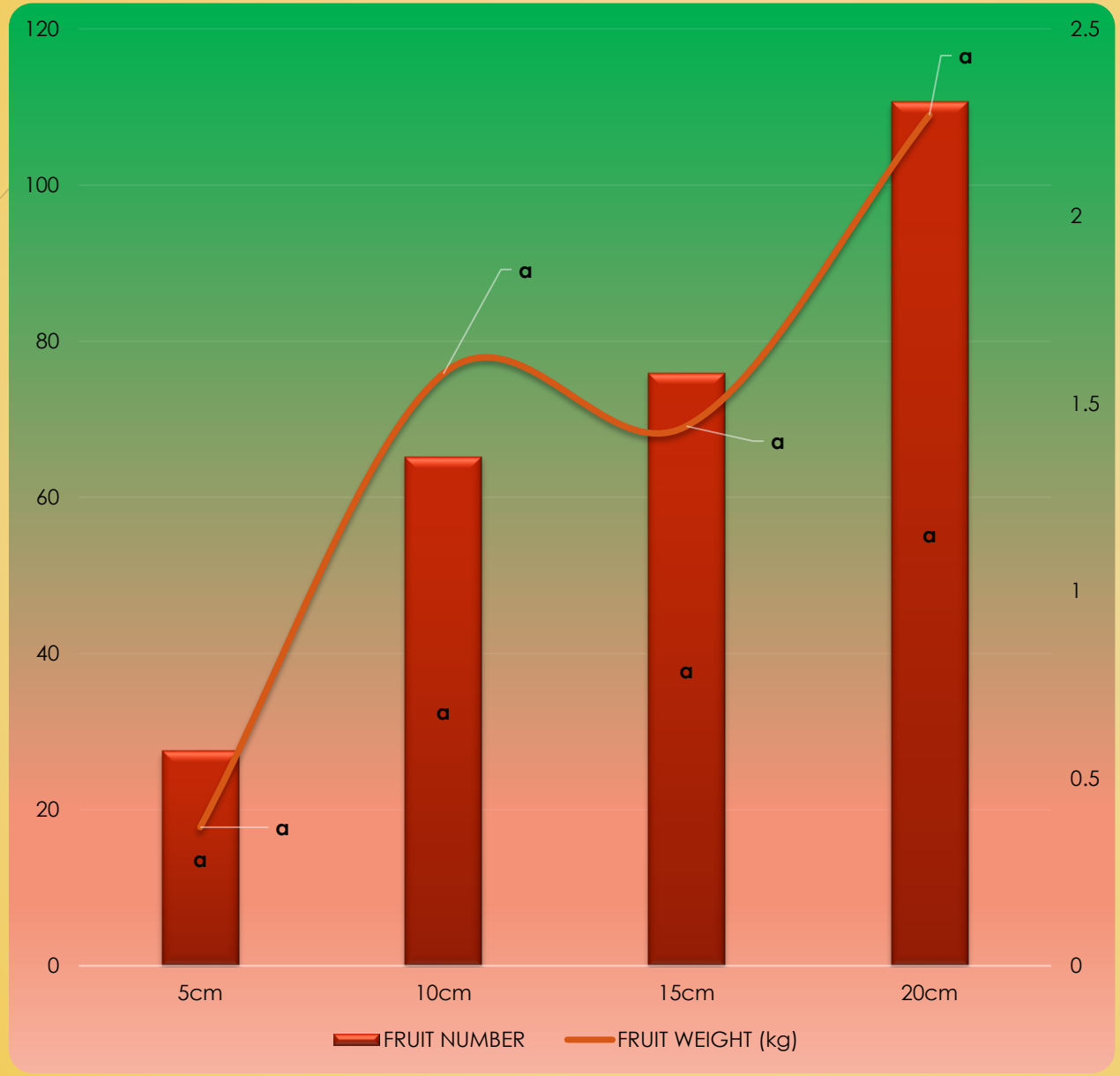

Table 3. Shiitake fruit weight, BE and ROCE on four *Alnus* log sizes

TREAT-MENT	LOG DIAMETER	FRUIT WEIGHT (kg log $^{-1}$)	BE (%)	ROCE (%)
T1	5cm	0.37	15.9	-8.61
T2	10cm	1.58	24.7	290.24
T3	15cm	1.44	11.6	255.67
T4	20cm	2.27	16.9	460.67
CV (%)		17.00		

Plate 3.1. Shiitake from 10 cm alder log

Plate 3.2. Cookies from alder logs of 10cm log diameter earlier inoculated show colonization of the spawn on most of the area

Plate 3.3. Shiitake from 15 cm diameter alder log

Plate 3.4. Cookies (below) from alder logs of 15 cm diameter earlier inoculated show colonization of the spawn on majority of the area.

4. Effect of log felling period of on yield of shiitake

Log felling period between October and March resulted in higher mushroom yield when compared to July-August as log felling period (Fig. 4) with concomitant high BE and ROCE (Table 4).

Fig. 4. Effect of log felling period on shiitake yield

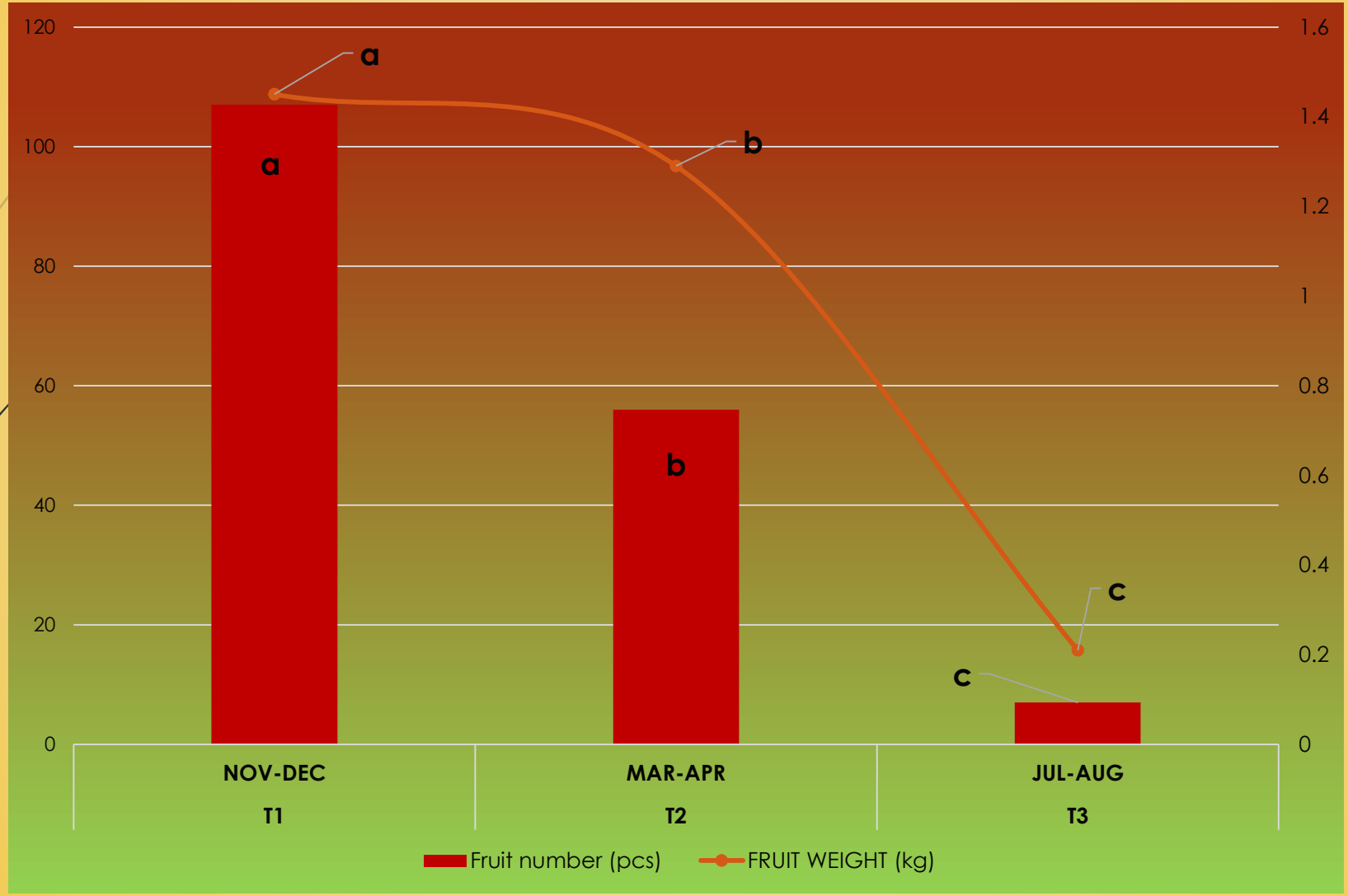

Table 4. Fruit weight of shiitake as affected by log felling period

Treat-ment	PERIOD OF LOG FELLING	FRUIT WEIGHT (kg log $^{-1}$)	BE (%)	ROCE (%)
T1	NOV-DEC	1.45	16.80	258.14
T2	MAR-APR	1.29	14.95	218.62
T3	JUL-AUG	0.21	2.40	-48.13
CV (%)		17.10		

Conclusions and Recommendation

High shiitake yield, BE and income can be realized when:

1. Using *L. edodes* 02 to inoculate pruned oak (*L. bennetii*) logs of 10 -15 cm diameter felled between December and March;

2. Using *L. edodes* 02 to inoculate alder (*Alnus japonica*) of 15 -20 cm diameter felled between December and March.

3. Shiitake production can be integrated into other agro-forestry systems such as coffee-based agro-forestry to address climate change.

Acknowledgments

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