



AgriSun Solutions pty ltd

PEACH, NECTARINE & PLUM APPLICATION GUIDE

Reflective Orchard Ground Film

Research-informed guidance
for commercial stone-fruit
orchards

Better Light Applied

1. PURPOSE OF THIS GUIDE

Reflective orchard ground film is used to alter the orchard light environment by redirecting a portion of incoming solar radiation from the orchard floor upward toward the canopy.

In stone fruit, published research has investigated reflective ground materials in relation to:

- fruit skin colour,
- canopy light,
- maturity,
- soluble solids,
- firmness,
- fruit quality,
- and pre-harvest application timing.

The evidence is strongest for **peaches and plums**.

For nectarines, reflective ground-cover application has been investigated, but the evidence currently available does not justify assigning one universal cultivar-specific installation period.

For this reason, this guide distinguishes between:

PUBLISHED STUDY TIMING

A timing directly used in published research.

and

SOUTH AFRICAN TRIAL REQUIRED

A cultivar or application where local evidence is still needed before AgriSun develops a precise commercial timing recommendation.

2. STONE FRUIT: WHY LIGHT MATTERS

Fruit within the same tree does not necessarily receive the same light environment.

Fruit may be:

- fully exposed,
- partially shaded,
- located inside the canopy,
- or positioned in lower canopy zones.

Reflective ground film can change the amount of light reaching these areas.

In peach research, reflective film has directly increased photosynthetically active radiation within the canopy and altered fruit skin colour under the conditions studied.

The key principle is therefore:

REFLECTIVE FILM IS A LIGHT-MANAGEMENT TOOL.

A colour response observed in one experiment does not automatically mean every other quality characteristic will also improve.

3. PEACHES

Peaches have particularly useful reflective-film research because more than one pre-harvest programme has been studied.

This means growers have genuine research reference points—but not one universal timing.

4. PEACH RESEARCH — MULTI-CULTIVAR COMMERCIAL TRIALS

Layne, Jiang and Rushing conducted replicated commercial-orchard research on reflective film in peaches.

The published work evaluated metallised reflective film across multiple peach cultivars and reported improvements in red skin coloration under the conditions of those experiments.

The commercial research programme used reflective film during approximately the:

FINAL 2–4 WEEKS BEFORE ANTICIPATED FIRST HARVEST

This should be understood as a **study treatment range**, not as a universal AgriSun prescription for all peaches.

5. WHAT THE MULTI-CULTIVAR PEACH RESEARCH FOUND

The researchers reported that reflective-film-treated fruit developed greater red skin coloration than control fruit.

The magnitude of the colour response differed among cultivars and experimental conditions.

The published work also reported changes in maturity-related measurements, demonstrating why colour and maturity should be monitored separately rather than assuming one response from the other.

PRACTICAL MESSAGE

The research supports the use of reflective film as a **short pre-harvest light-management treatment** in peaches.

However:

2 weeks is not automatically better than 4 weeks.

4 weeks is not automatically better than 2 weeks.

The most appropriate treatment period can depend on cultivar, maturity stage, orchard conditions and the production objective.

6. TAIKO PEACH — 7-DAY STUDY

A separate 2021 study evaluated reflective film in:

‘TAIKO’ PEACH

The reflective film was installed beneath the trees:

7 DAYS BEFORE HARVEST.

The researchers measured:

- photosynthetically active radiation within the canopy,
 - fruit skin colour,
 - soluble solids,
 - titratable acidity,
 - firmness,
 - and expression of genes associated with colour and ripening.
-

7. WHAT THE TAIKO RESEARCH FOUND

The reflective-film treatment increased PAR within the tree canopy.

Fruit from the reflective-film treatment also showed significant changes in measured skin colour.

However, the researchers found **no significant differences** between treated and untreated fruit in:

- total soluble solids,
- titratable acidity,
- or firmness.

This is an especially useful finding for AgriSun.

THE COLOUR RESPONSE CHANGED.

BRIX, ACIDITY AND FIRMNESS DID NOT SIGNIFICANTLY CHANGE.

Therefore, AgriSun should not advertise reflective film as though improved colour automatically means:

- increased °Brix,
- softer fruit,
- firmer fruit,
- or changed acidity.

Each variable needs to be measured independently.

8. PEACH TIMING — WHAT CAN WE ACTUALLY SAY?

Published peach research gives us at least two clear reference programmes:

MULTI-CULTIVAR COMMERCIAL RESEARCH

Approximately 2–4 weeks before anticipated first harvest

TAIKO

7 days before harvest

These treatments were conducted in different cultivars and growing environments.

AGRISUN POSITION

There is therefore **no scientifically justified single timing for all peaches.**

The correct commercial message is:

Published peach studies have evaluated reflective film from approximately one week to several weeks before harvest.

Cultivar-specific South African trials should determine where within that range a particular cultivar responds best.

9. WHERE REFLECTIVE FILM MAY BE RELEVANT IN PEACHES

A grower may consider a controlled trial where:

- interior fruit colours less strongly than exterior fruit,
- lower-canopy fruit remains pale,
- fruit colour is affecting market grade,
- canopy density limits light penetration,
- or final-stage colour development is commercially important.

Reflective film may be particularly relevant where the production objective is:

MORE EVEN LIGHT DISTRIBUTION DURING FINAL FRUIT DEVELOPMENT.

10. WHAT TO MEASURE IN A PEACH TRIAL

BEFORE INSTALLATION

Record:

- ☐ Cultivar
- ☐ Block
- ☐ Expected harvest date
- ☐ Current fruit colour
- ☐ Fruit-development stage
- ☐ Existing maturity
- ☐ Canopy density
- ☐ Row orientation

- ☐ Existing sunburn
 - ☐ Film position
-

DURING THE TRIAL

Monitor:

- ☐ Fruit colour
 - ☐ Fruit exposure
 - ☐ Canopy condition
 - ☐ Fruit-surface temperature where practical
 - ☐ Sunburn
 - ☐ Weather conditions
 - ☐ Film condition
-

AT HARVEST

Measure:

SKIN COLOUR

Compare treated and untreated fruit.

Where possible, distinguish:

- exterior fruit,
- inner-canopy fruit,
- upper canopy,
- lower canopy.

SOLUBLE SOLIDS

Record:

°Brix / TSS

FIRMNESS

Measure using the same method in treated and untreated fruit.

ACIDITY

Where relevant, record titratable acidity.

MATURITY

Use normal cultivar-specific maturity assessment.

FRUIT SIZE

Measure:

- diameter,
- weight,
- commercial size class.

EXTERNAL QUALITY

Record:

- sunburn,
 - blemishes,
 - cracking where relevant,
 - skin defects,
 - commercial pack-out.
-

11. SOUTH AFRICAN PEACH TRIAL PRIORITY

HIGH PRIORITY

South African peach trials should investigate:

- whether short 7-day treatments are sufficient in some cultivars,
- whether 2–4-week treatments produce stronger colour responses,
- cultivar differences,
- film position,
- canopy response,
- fruit-surface temperature,
- sunburn,
- and commercial pack-out.

The goal should not be to prove that reflective film “works.”

The goal should be to determine:

WHICH CULTIVARS RESPOND?

AT WHAT STAGE?

WITH WHAT COMMERCIAL EFFECT?

12. NECTARINES

Nectarines are closely related botanically to peaches, but AgriSun should not simply assume that a peach programme can be transferred to nectarines.

Published stone-fruit research and commercial orchard programmes have included nectarines, but the cultivar-specific timing evidence is not strong enough to publish one universal number of days before harvest.

AGRISUN POSITION

REFLECTIVE FILM MAY BE TRIALLED IN NECTARINES.

A UNIVERSAL PRE-HARVEST TIMING SHOULD NOT YET BE PUBLISHED.

13. WHERE REFLECTIVE FILM MAY BE RELEVANT IN NECTARINES

Potentially where:

- red skin colour is commercially important,
- fruit within the canopy remains under-coloured,
- shaded fruit differs visibly from exposed fruit,
- or the grower wants to evaluate final-stage canopy-light management.

Potential cultivars for South African evaluation may include:

- Fantasia,
 - SunGlo,
 - Arctic Sweet,
 - May Glo,
 - and other commercially important coloured nectarines.
-

14. NECTARINES — PUBLISHED TIMING

NO UNIVERSAL CULTIVAR-SPECIFIC TIMING ESTABLISHED FOR AGRISUN.

AgriSun should not say:

“Install nectarine film 7 days before harvest”

simply because that was studied in Taiko peach.

Nor should it automatically say:

“Install 2–4 weeks before harvest”

because that timing was demonstrated in peach research.

Those studies provide useful background, not a nectarine-specific prescription.

15. WHAT TO MEASURE IN A NECTARINE TRIAL

COLOUR

Record:

- percentage red surface,
- colour intensity where possible,
- canopy position.

SOLUBLE SOLIDS

Record:

°Brix

FIRMNESS

Compare treated and control fruit.

ACIDITY

Record where relevant.

FRUIT SIZE

Measure:

- diameter,
- weight,
- commercial size grade.

MATURITY

Use the orchard's normal cultivar-specific maturity programme.

HEAT / SUNBURN

Record:

- fruit exposure,
- sunburn incidence,
- fruit-surface temperature where practical.

COMMERCIAL QUALITY

Record:

- skin blemishes,
 - external defects,
 - pack-out.
-

16. SOUTH AFRICAN NECTARINE TRIAL PRIORITY

VERY HIGH PRIORITY

Nectarines are one of the clearest crops where AgriSun should develop its **own local timing evidence**.

A good programme would compare, for example:

EARLIER PRE-HARVEST TREATMENT

against

SHORTER FINAL-STAGE TREATMENT

against

UNTREATED CONTROL.

The exact treatment periods should be agreed with the participating grower or horticultural adviser based on cultivar maturity and the research question rather than marketed as established recommendations before the data exist.

17. WHAT SOUTH AFRICAN NECTARINE TRIALS SHOULD ANSWER

For each cultivar:

Does reflective film change fruit skin colour?

How quickly does a measurable response occur?

Does canopy position matter?

Is there any measurable change in °Brix?

Is firmness affected?

Does fruit-surface temperature change?

Is sunburn incidence affected?

Does commercial pack-out change?

Once these questions are answered, AgriSun can develop genuinely cultivar-specific local recommendations.

18. PLUMS

Plums have useful published timing research.

A published experiment directly compared reflective mulch applied:

1 WEEK BEFORE HARVEST

2 WEEKS BEFORE HARVEST

3 WEEKS BEFORE HARVEST

4 WEEKS BEFORE HARVEST.

This is valuable because the study did not simply compare “film” against “no film.”

It compared **different application periods**.

19. WHAT THE PLUM RESEARCH FOUND

The researchers reported that reflective mulch increased measured light intensity and affected fruit-quality characteristics under the conditions of the experiment.

Among the application periods tested:

**THE 3-WEEK TREATMENT
PRODUCED THE HIGHEST
OVERALL FRUIT-QUALITY
RESULT IN THAT EXPERIMENT.**

This needs to be worded carefully.

It does **not** mean:

“Three weeks is the optimum reflective-film timing for every plum.”

It means:

“Among the four timings compared in that particular experiment, the three-week treatment produced the strongest overall fruit-quality result.”

That distinction should remain everywhere AgriSun discusses this study.

20. PLUM TIMING — PUBLISHED RESEARCH REFERENCE

1 WEEK

Studied.

2 WEEKS

Studied.

3 WEEKS

Studied — strongest overall fruit-quality result in that experiment.

4 WEEKS

Studied.

AGRISUN POSITION

Three weeks is therefore a **useful trial benchmark**, not a universal commercial recommendation.

21. WHERE REFLECTIVE FILM MAY BE RELEVANT IN PLUMS

Potentially where:

- colour varies significantly within the canopy,
- interior fruit remains less coloured,
- final skin colour influences market grade,
- or growers are evaluating light management during final fruit development.

Potential South African trial cultivars include:

- Angeleno,
 - Laetitia,
 - Fortune,
 - Songold,
 - Sapphire,
 - and other commercial cultivars.
-

22. WHAT TO MEASURE IN A PLUM TRIAL

FRUIT COLOUR

Record:

- treated vs control,
- canopy position,
- percentage coloured surface where appropriate.

SOLUBLE SOLIDS

Record:

°Brix / TSS

FRUIT WEIGHT & SIZE

Measure:

- weight,
- diameter,
- commercial size grade.

FIRMNESS

Compare using the same method.

MATURITY

Record according to the cultivar's normal harvest programme.

ACIDITY

Measure where relevant.

EXTERNAL QUALITY

Record:

- sunburn,
- cracking,
- skin defects,
- other commercial blemishes.

PACK-OUT

Where practical, compare:

- export grade,
 - local-market grade,
 - reject category.
-

23. SOUTH AFRICAN PLUM TRIAL PRIORITY

HIGH PRIORITY

The published plum study gives AgriSun a very useful starting point.

A South African trial could directly test whether the three-week benchmark is appropriate locally.

An especially useful design would compare:

3 WEEKS BEFORE HARVEST

against

AN ALTERNATIVE LOCAL TIMING

against

UNTREATED CONTROL.

This would allow AgriSun to determine whether the published three-week response translates into South African commercial orchards.

24. QUICK TIMING SUMMARY

Crop	What published research allows us to say
Peach — Taiko	7 days before harvest directly studied
Peach — multi-cultivar commercial research	Approximately 2–4 weeks before anticipated first harvest studied
Nectarines	Application has been investigated, but no

Crop	What published research allows us to say
	universal cultivar-specific AgriSun timing should be published
Plums	1, 2, 3 and 4 weeks before harvest compared; 3 weeks performed best overall in that experiment

25. WHAT DOES THIS MEAN FOR SOUTH AFRICAN STONE FRUIT?

PEACHES

We have useful international timing references.

South Africa needs to determine:

- cultivar response,
 - best local deployment period,
 - heat/sunburn interaction,
 - pack-out effect.
-

NECTARINES

The timing question remains substantially more open.

South Africa needs to determine:

- whether reflective film produces a useful colour response,
 - which cultivars respond,
 - treatment duration,
 - fruit-temperature response,
 - quality response.
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PLUMS

We have a particularly useful three-week research benchmark.

South Africa needs to determine:

- whether three weeks remains the strongest local timing,
 - which cultivars respond,
 - whether quality/pack-out responses justify the treatment.
-

26. SOUTH AFRICAN TRIAL PRIORITIES

PRIORITY 1 — NECTARINES

Because cultivar-specific timing remains uncertain.

Recommended focus:

- Fantasia,
 - SunGlo,
 - Arctic Sweet,
 - May Glo,
 - other commercially important coloured cultivars.
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PRIORITY 2 — PLUMS

Validate the published three-week benchmark.

Potential cultivars:

- Angeleno,
 - Laetitia,
 - Fortune,
 - Songold,
 - Sapphire.
-

PRIORITY 3 — PEACHES

Compare shorter and longer pre-harvest programmes in commercially important South African cultivars.

Focus on:

- skin colour,
 - maturity,
 - Brix,
 - firmness,
 - fruit temperature,
 - sunburn,
 - pack-out.
-

27. CORE TRIAL DESIGN

For all three crops:

AGRISUN TREATED AREA

Reflective ground film installed according to the planned treatment.

UNTREATED CONTROL

Comparable trees managed under the grower's normal programme.

Where more than one timing is being compared:

TREATMENT A

Earlier installation.

TREATMENT B

Later installation.

CONTROL

No reflective film.

Keep orchard management as comparable as reasonably possible.

28. CORE MEASUREMENTS

Every AgriSun stone-fruit trial should consider recording:

COLOUR

Because this is one of the clearest responses reported in peach research.

BRIX / SOLUBLE SOLIDS

Because not every colour response is accompanied by a Brix response.

FIRMNESS

Particularly important for harvest and post-harvest handling.

ACIDITY

Where commercially relevant.

FRUIT SIZE

Weight and/or diameter.

MATURITY

According to established cultivar-specific harvest criteria.

SUNBURN / HEAT DAMAGE

Particularly under South African high-radiation conditions.

EXTERNAL QUALITY

Skin damage, defects and blemishes.

PACK-OUT

Where possible, this is ultimately one of the most commercially useful measurements.

29. IMPORTANT INTERPRETATION RULE

**COLOUR $\neq$ BRIX $\neq$ SIZE $\neq$ YIELD $\neq$
PROFITABILITY**

A change in one characteristic does not establish a change in another.

The Taiko study is a good example:

The researchers measured improved skin coloration and increased canopy PAR, while soluble solids, acidity and firmness did not differ significantly from the control.

AgriSun should therefore report each measured response separately.

30. WHAT AGRISUN SHOULD NOT CLAIM

AgriSun should not claim that reflective orchard film universally:

- improves peach colour,
- increases peach °Brix,
- increases nectarine colour,
- increases plum Brix,
- improves fruit size,
- increases yield,
- reduces sunburn,
- improves pack-out,
- or produces a particular financial return.

Individual studies have reported some responses under specific conditions.

Those research findings should remain attributed to those studies.

31. SCIENTIFIC REFERENCES

PEACH — MULTI-CULTIVAR COMMERCIAL RESEARCH

Layne, D.R., Jiang, Z. & Rushing, J.W. (2001).

Tree Fruit Reflective Film Improves Red Skin Coloration and Advances Maturity in Peach.

HortTechnology, 11(2), 234–242.

DOI: 10.21273/HORTTECH.11.2.234.

PEACH — TAIKO

Lee, D.B., Lee, G.J., You, Y.J., Ahn, S.Y. & Yun, H.K. (2021).

Reflective Film Mulching Before Harvest Promotes Coloration and Expression of Ripening-Related Genes in Peach Fruits.

Horticultural Science and Technology, 39(3), 324–331.

DOI: 10.7235/HORT.20210029.

PLUM

Kim, E.J., Choi, D.G. & Jin, S.N. (2008).

Effect of Pre-Harvest Reflective Mulch on Growth and Fruit Quality of Plum (*Prunus domestica* L.).

Acta Horticulturae 772.

DOI: 10.17660/ActaHortic.2008.772.54.

32. IMPORTANT USE NOTICE

Published research findings described in this guide relate to the particular cultivars, reflective materials, timings, orchard systems and environmental conditions evaluated in those experiments.

Peach

Published research provides useful pre-harvest timing references, but does not establish one timing for every cultivar.

Nectarine

Cultivar-specific South African timing remains to be established.

Plum

The three-week treatment performed best among the timings evaluated in the cited experiment, but this should not be interpreted as a universal optimum.

Where AgriSun is introduced into a new stone-fruit cultivar or production system, controlled local evaluation is recommended before large-scale deployment.

AGRISUN REFLECTIVE SOLUTIONS

Better Light. Applied With Evidence.

Published research gives us the starting point.

South African trials determine which timing, cultivar and orchard conditions produce a commercially meaningful response locally.