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Occupational Health & Safety Risk in the Horticulture Industries –THE FACTS–

2005

Facts and Figures on Farm
Health and Safety Series
No 3



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Contents

1.	Introduction	4
2.	Horticulture industries in Australia	5
3.	Injury deaths—all agriculture sectors	6
4.	Deaths on horticulture production farms	8
5.	Workers' compensation claims	9
6.	Agency of workers' compensation claims	10
7.	Mechanism of injury of workers' compensation claims	11
8.	Noise and hearing loss	12
9.	Pesticides	13
	References and Contacts	14

1. Introduction

Agriculture and horticulture enterprises produce commodities of more than \$30 billion value per annum on around 135 000 enterprises spread across all states of Australia. However, that production is associated with a high cost in terms of human injury. High rates of serious injury and deaths on Australian farms are of concern to agricultural industry bodies, farmers, workers and farm enterprises and federal and state governments.

Farmsafe Australia, the national association of agencies with a commitment to reducing injury risk on Australian farms, is working with the horticultural industries to implement the *Health and Safety in the Horticultural Industry: An Industry Strategy 2004-2009*.

Strategic approaches to reducing farm injury risk are multifaceted and include:

- identifying elimination and substitution options
- improving design and engineering solutions
- administrative or work practice solutions, including education and skills development
- identification of requirements for personal protective clothing and equipment
- identification of incentives for adoption of improved systems
- ensuring compliance with regulatory requirements for supply of safe plant and equipment and safe operation in the farm workplace.

This document has been produced to provide guidance to those agencies and individuals who are working to reduce risk associated with horticultural production in Australia. The publication is available electronically for use by educators and speakers in their efforts to raise awareness and promote horticultural production safety, and for those whose role is the development of public and industry policy to improve safety.



2. Horticulture industries in Australia

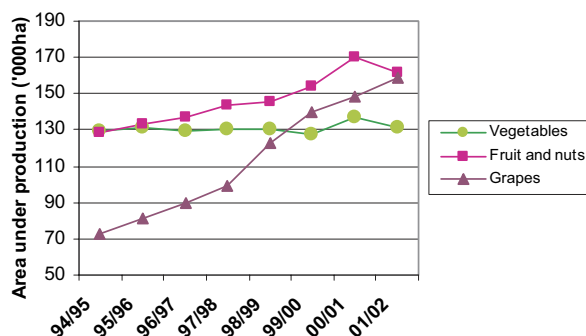
Horticultural production – fruit, vegetable and flower production - is currently carried out on an estimated 22,460 rural properties in Australia. Horticultural establishments comprise approximately 16% of all Australian agricultural enterprises. Table 1 indicates the number of commercial enterprises reporting undertaking horticultural production in 2002.

Table 1 Establishments undertaking agricultural activity, Australia 30 June 2002

	NSW	Vic.	Qld	SA	WA	Tas	NT	ACT	Aust.
Plant nurseries	858	340	625	130	189	52	21	5	2,220
Cut flower/flower seed	263	224	185	87	140	38	9	-	945
Vegetable growing	831	1,011	1,379	513	517	545	9	-	4,805
Grape growing	1,220	2,243	167	2,448	628	119	4	4	6,833
Apple/pear growing	176	307	37	108	154	137	-	1	919
Stone fruit growing	435	294	114	195	178	41	-	1	1,258
Kiwi fruit growing	24	4	3	-	4	-	-	-	34
Fruit growing nec	1,881	510	2,018	560	318	43	116	-	5,446
Grain growing	4,193	2,996	1,715	4,120	2,851	33	2	-	15,911
Grain-sheep/beef cattle	6,669	2,824	1,289	1,915	2,860	52	-	1	15,610
Sheep-beef cattle	3,726	2,288	867	795	453	269	-	26	8,424
Sheep farming	5,588	4,218	444	1,515	1,436	679	-	30	13,911
Beef cattle farming	10,722	7,698	11,285	1,234	1,893	1,048	211	19	34,110
Dairy cattle farming	1,615	6,696	1,292	590	358	580	3	1	11,135
Poultry farming (meat)	339	186	126	67	58	14	1	-	790
Poultry farming (eggs)	130	152	84	30	61	18	5	1	481
Pig farming	399	192	328	124	87	27	1	-	1,159
Horse farming	631	389	516	^57	129	53	-	3	1,777
Deer farming	28	38	**	21	**	11	-	-	125
Livestock nec	311	133	194	14	66	6	2	-	725
Sugar cane growing	521	**	4,219	-	5	-	-	-	4,747
Cotton growing	321	-	375	-	-	-	-	-	697
Crop/plant nec	214	536	616	130	108	190	11	1	1,806
Total	41,092	33,282	27,900	14,654	12,499	3,953	395	93	133,868

Source: Australian Bureau of Statistics. Agricultural Commodities, Australia, 2001-02 (7121.0).

Figure 1 Area under production of vegetables, fruit and nuts and grapes, Australia (1994/95-2001/02)



Source: ABS (2002)

3. Injury deaths—all agriculture sectors

Table 2 indicates the causes of non-intentional traumatic death of those persons whose occupation at time of death was farmer, farm manager or farm worker, for the years 1999 to 2002, and covers claims from all agricultural industries including horticultural enterprises. The data does not include fatalities of visitors such as children or students or other occupational groups such as tradespersons or contractors working in the farm workplace but does include injury deaths associated with on-road transportation accidents.

Table 2 Causes of injury deaths of those whose occupation was farm manager or agricultural worker who died 1999-2002, Australia (ICD 10-AM)

Code No	Descriptions	99	00	01	02	Z	%
V01-09	Pedestrian injured in transport accidents	8	14	15	7	44	5.3
V10-19	Pedal cyclist injured in transport accidents	0	0	1	0	1	0.1
V20-29	Motor cycle rider injured in transport accidents	9	4	10	10	33	4.0
V30-39	Occupant of three wheeled motor vehicle injured in transport accident	0	0	1	0	1	0.1
V40-49	Car occupant injured in transport accident	50	57	54	68	229	27.8
V50-59	Occupant of pick-up truck or van injured in transport accident	2	1	7	0	10	1.2
V60-69	Occupant of heavy transport vehicle injured in transport accident	1	1	1	2	5	0.6
V80-89	Other land transport accidents	27	12	19	19	77	9.3
V80	Animal ridden	1	1	2	1	5	0.6
V84	Special vehicle mainly used in agriculture(tractors)	10	7	10	6	33	4.0
V86	Special all-terrain vehicle(ATV)	5	2	5	8	20	2.4
V90-94	Water transport accidents	0	3	1	2	6	0.7
V95-97	Air & space transport accidents	2	3	5	1	11	1.3
W00-19	Falls	15	10	25	13	63	7.6
W20-49	Exposure to inanimate mechanical forces	17	19	8	17	61	7.4
W20	Struck by thrown, projected or falling object	6	5	4	5	20	2.4
W23	Caught, crushed, jammed, pinched in or between objects	1	1	1	1	4	0.5
W25	Contact with sharp glass	0	0	0	1	1	0.1
W29	Other powered hand tools & household machinery	0	0	0	1	1	0.1
W30	Contact with agricultural machinery	3	5	2	3	13	1.6
W31	Contact with other and unspecified machinery	0	1	1	1	3	0.4
W33-34	Firearms	6	6	0	4	16	1.9
W50-64	Exposure to animate mechanical forces	3	0	2	0	5	0.6
W65-74	Accidental drowning & submersion	5	4	11	5	25	3.0
W75-84	Other accidental threats to breathing	3	5	3	8	19	2.3
W85-99	Exposure to electric current, radiation and external ambient air temperature & pressure	1	2	3	2	8	1.0
X00-X09	Exposure to fire, smoke & flames	4	5	8	6	23	2.8
X10-X19	Contact with heat & hot substances	0	0	0	1	1	0.1
X20-29	Contact with venomous animals & plants	1	0	1	1	3	0.4
X30-39	Exposure to forces of nature	1	2	0	1	4	0.5
X40-49	Accidental poisoning	16	9	9	4	38	4.6
X50-57	Overexertion, travel & privation	0	1	0	0	1	0.1
X58-59	Accidental exposure to other & unspecified factors	28	38	26	42	134	16.2
Y85-89	Sequelae of external causes of morbidity & mortality	5	2	7	2	16	1.9
Total		199	192	217	211	818	100

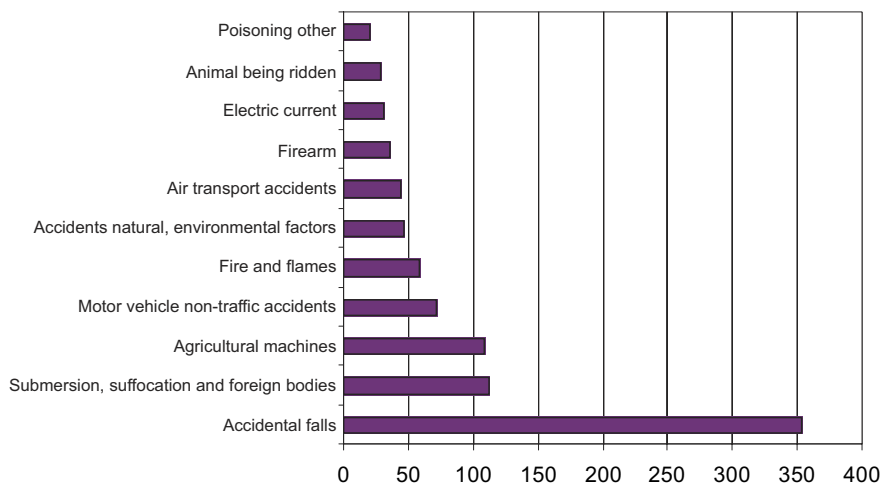
Source: NFIDC ABS Deaths Database (HOIST NSW Health)

*Excludes road traffic deaths, medical misadventure and poisoning by medicinals

3. Injury deaths—all agriculture sectors (continued)

Figure 2 demonstrates the relative contribution of causes of injury deaths of Australian farmers and farm workers across all industries, for the period 1990-1998. This data excludes all road traffic injury.

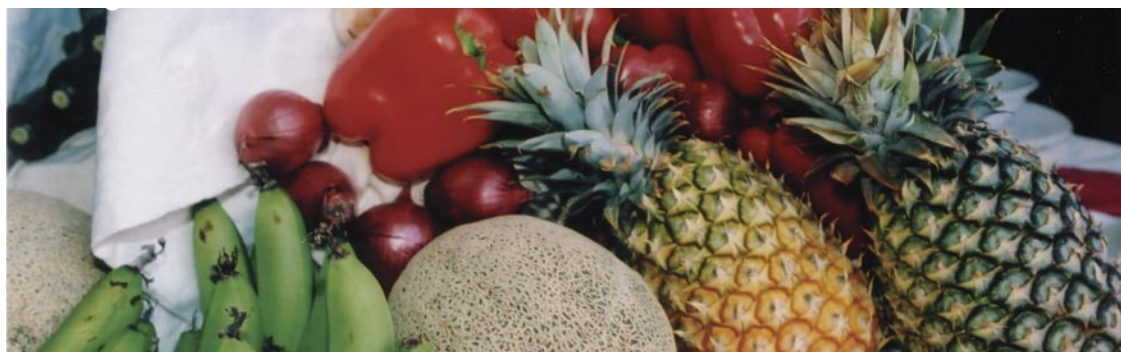
Figure 2 Causes of non-intentional injury deaths* of farmers and farm workers, Australia 1990-98 (n=912)



Source: NFIDC ABS Deaths Database (HOIST NSW Health)

*Excludes road traffic deaths, medical misadventure and poisoning by medicinals

Although the proportion of these deaths relating specifically to horticultural producers or workers is not known, many of the injury risks are shared in common between specific groups in the agriculture sector, and hence the available data should be considered to be broadly relevant to horticulture industries.



4. Deaths on horticulture production farms

Tables 3 and 4 show details of non-intentional traumatic deaths on Australian farms for the period 1989-1992, where there were 20 deaths that occurred on fruit producing farms and another 21 deaths on vegetable producing properties. This equates to 10.25 deaths per annum to produce \$5,973 million gross value product (2001/02, ABS 2002), or 1.7 deaths per \$1 million gross value product.

Deaths were associated with a range of agents, the prime one being the *tractor* (27% of all deaths).

Table 3 Agent of fatal incident on orchards & other fruit farms, by work status, Australia 1989-1992

Agent	Working	Bystander	Total
Trailer	-	2	2
Motorcycle	1	2	3
Tractor	4	2	6
Slasher	-	1	1
Ladder	1	-	1
Firearm	2	-	2
Timber	1	-	1
Dam/irrigation channel	-	5	5
Other farm structures	2	-	2
Total	10	10	20

Source: Franklin et al. (1989-1992)

Table 4 Agent of fatal incident on vegetable* producing farms, by work status, Australia 1989-1992

Agent	Working	Bystander	Total
Truck/car	3	-	3
Tractor	4	1	5
Tillage seeder		1	1
Posthole digger	1	-	1
Other mobile plant	1	-	1
Electric drill	1	-	1
Other workshop equipment	1	-	1
Forklift	1	-	1
Dam	1	1	2
Embankment	1	-	1
Powerlines	2	-	2
Horse	1	-	1
Snake	1	-	1
Total	18	3	21

Source: Franklin et al. (1989-1992) *Includes potatoes

Although the data above is more than 10 years old, the number of deaths of farmers/farm workers has shown no downward trend between 1992 and 2001, suggesting that the information may be relevant. The major change during this period has been the increased use of ATVs, which at time of publication are associated with around 10 on-farm deaths per annum.

Tractor safety is a priority for injury prevention programs in the horticultural industry. While the introduction of ROPS legislation may reduce rollover deaths, runover hazard remains a high risk.

5. Workers' compensation claims

Australia-wide there were 4,316 workers' compensation claims made in the year 2002 for injury in the agriculture sector. Of these, more than 1,378 (32%) were in the horticulture and fruit growing industries.

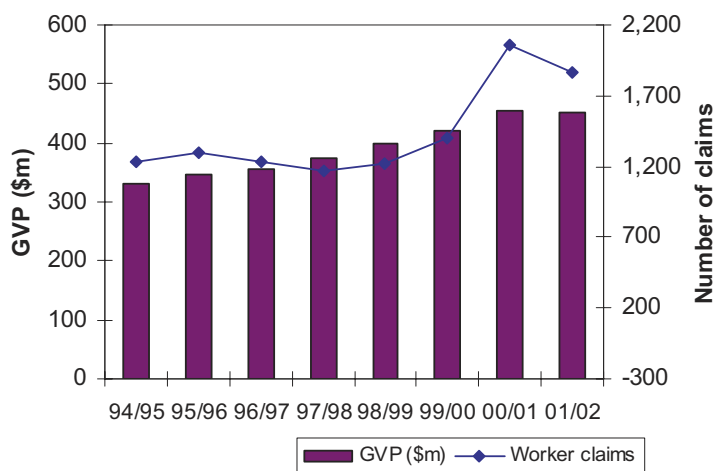
Table 5 Incidence of workers' compensation claims*, Australia 2002

Industry	Incidence per 1000 workers		
	Female	Male	Total
Horticulture & Fruit Growing	15.9	22.8	20.3
Grain, Sheep & Beef Cattle Farming	7.8	28.1	23.3
Dairy Cattle Farming	11.8	24.0	19.9
Poultry Farming	38.6	33.9	35.6
Other Livestock Farming	53.5	76.5	68.5
Other Crop Growing	35.1	34.1	34.3
All agriculture	15.7	27.8	24.2
All industries	11.6	22.5	17.4

Source: NOSI2 Databases, NOHSC website January 2005

*Duration of absence was greater than one week & excluding travel claims

Figure 3 Number of workers' compensation claims (all)* and total gross value of product (vegetables/fruit and nuts/grapes) for horticultural industry, Australia 1994/95-2001/02



Source: (a) NOSI&2 Databases, NOHSC website (May 2005) (Note: *travel claims excluded, NOSI2 data provided as calendar year 2001 & 2002)
(b) ABS (2002)

The trend of number of claims since 1994/95 has been increasing, although the rate of claims in the sector may well be different in light of the changes in production in that time.

6. Agency of workers' compensation claims

The large proportion of workers' compensation claims are associated with use of non-powered hand-tools an equipment and with environmental agencies. Mobile plant and equipment are also important.

Table 6 Number of workers' compensation claims* in the horticulture and fruit growing industries, Australia 1995/96-2000/01

Breakdown Agency	Female	Male	Total
Machinery & (mainly) fixed plant	108	350	458
Mobile plant & transport	256	930	1186
Powered equipment, tools & appliances	35	147	182
Non-powered hand-tools, appliances & equipment	648	1746	2394
Chemicals & chemical products	27	109	136
Materials & substances	224	577	801
Environmental agencies	681	1352	2033
Animal, human & biological agencies	48	122	170
Other & unspecified agencies	520	937	1457
Total	2547	6270	8817

Source: NOSI Databases. National Occupational Health and Safety Website. www.nohsc.gov.au

*Duration of absence was greater than one week & excluding travel claims

A more specific breakdown of claims for the period 1994/95 to 1999/00, shows that the following are the dominant agencies of associated injury/illness claims (numbers):

Mobile plant and transport	Tractors	244
	Trailers	124
	Trolleys/handcarts	73
	Ploughs/harrows/cultivators	25
	Self propelled harvesters	104
	Conveyor belts and escalators	37
	Power hoists	45
	Forklift trucks	70
	Trucks	92
	Cars and utilities	68
Powered equipment	Motorcycles	62
	Chainsaws	32
Outdoor environment	Holes in ground – outdoor	126
	Wet oily traffic area	74
	Fencing	32
	Vegetation	869
	Traffic area	348
Non-powered handtools and equipment	Knives	256
	Scissors	209
	Shovels, spades	65
	Fastening, packaged/fastening equipment	385

All of the above need to be considered in programs to improve safety in the horticultural industries.

7. Mechanism of injury of workers' compensation claims

Table 7 below indicates that the dominant mechanisms of injury in the horticulture industries for the period 1995/96-1999/00 are *body stressing*, followed by *trips and falls* and being *hit by moving object*.

Table 7 Workers' compensation claims* in the horticulture and fruit growing industries, by mechanism and agency of injury, Australia 1995/96–1999/00

Breakdown Agency	Falls, trips & slips of a person	Hitting objects	Hit by moving objects	Sound & pressure	Body stressing	Heat, radiation electricity	Chemicals	Biological factors	Mental stress	Other & unspecified	Total
Machinery & (mainly) fixed plant	58	53	172	#	78	8	#	0	0	8	380
Mobile plant & transport	273	73	321	#	199	#	0	0	0	139	1014
Powered equipment, tools	#	38	45	0	59	9	0	0	0	#	155
Non-powered handtools, & equipment	549	387	256	#	828	0	0	0	0	18	2041
Chemicals	6	0	8	0	41	#	62	0	0	#	124
Materials & substances	36	58	109	0	414	16	8	#	0	#	647
Environmental agencies	821	101	92	13	639	#	35	0	0	53	1756
Animal, human & biological agencies	12	7	44	0	29	#	34	#	#	#	141
Other & unspecified	117	60	87	10	635	7	10	13	22	330	1292
Total	1875	777	1134	33	2922	52	150	19	27	560	7550

Source: NOSI Databases. National Occupational Health and Safety Website. www.nohsc.gov.au

*Duration of absence was greater than one week & excluding travel claims

Less than 5 cases

Safety programs in the horticultural industries should address **manual handling** and ergonomic hazards.

8. Noise and hearing loss

Noise on farms has been well established as posing risk of noise induced hearing loss and tinnitus in farmers and farm workers. The following table indicates the noise levels with recommended exposure limits for a range of relevant activities on rural properties.

Table 8 Average noise levels and recommended exposure limits for common farm machinery and activities

Machinery/Worker Position during normal operating conditions	Noise level at operator's ear Average & Range (95% CI) L _{Aeq} dB(A)	Recommended exposure limits without hearing protection. NB: Noise exposure risk for each activity in the day is cumulative toward the overall noise exposure risk.**.
Air compressors	86 (77- 95)	7 hrs (15 mins - 8 hrs+)
All terrain vehicles (ATVs)	86 (84 - 87)	7 hrs (4 - 8 hrs)
Angle grinders	98 (96 - 100)	20 mins (15 - 30 mins)
Others in workshop	90 (87 - 93)	2 hrs (1 - 5 hrs)
Augers	93 (89-96)	1 hr (30 mins - 3 hrs)
Bench grinders	99 (94 - 104)	18 mins (5 mins - 1 hr)
Others in workshop	89 (82 -96)	3 hrs (40 mins - 8 hrs)
Bulldozers	99 (97 - 100)	18 mins (15 - 30 mins)
Chainsaws	106 (104 - 107)	3 mins (2 - 5 mins)
Others stacking wood	96 (93 - 99)	40 mins (15 - 50 mins)
Circular saws	99 (98 - 101)	18 mins (10 - 20 mins)
Others in workshop	89 (84 - 94)	3 hrs (1- 8 hrs)
Cotton module press	86 (85 - 88)	6 hrs (4 - 8 hrs)
Cotton picker	81 (78 - 85)	8 hrs (8 hrs+)
Farm trucks	85 (83 - 88)	8 hrs (4 - 8 hrs)
Forklifts	84 (81-88)	8 hrs (4 - 8 hrs)
Firearms	Lpk 140+ dB	no exposure
Harvesters	83 (75 - 91)	8 hrs (2 - 8 hrs)
Irrigation pumps	100 (96 - 104)	15 mins (5 -30 mins)
Motorbikes - 2 wheel	81 (70 - 92)	8 hrs (1.5 - 8 hrs+)
Packing shed workers	80 (78 - 82)	8 hrs (8 hrs+)
Sugarcane harvester	86	7 hrs
Tractors with cabins	76 (75 - 78)	no limit
Av.increase with radio on	3 - 5 dB	8 hrs (8 hrs+)
Others in field	85 (80 - 90)	8 hrs (2 - 8 hrs+)
Tractors without cabins	92 (90 - 93)	1.5 (1 - 2) hrs
Others in field	82 (78 - 86)	8 hrs (6 - 8 hrs+)

Source: Farmsafe Australia. Noise Injury Prevention Strategy.2002

**For example: If exposed to noisy activity for half the recommended daily limit (eg. Angle grinder for 10 min of a 20 min daily limit), the remaining noise exposure in the day should not exceed half the recommended daily limit for another activity (eg. A limit of 4 hrs instead of 8hr on a tractor with a radio).

Cattle property managers need to ensure that all workers are protected from damaging noise levels.

9. Pesticides

The horticultural industries have long been identified as being heavily dependent on pesticide use, where plant treatment chemicals such as insecticides, herbicides and fumigants are important for both pre and post harvest treatments.

While data which reveals the full extent of the adverse health effects associated with pesticides is limited, workers' compensation claims data suggest that workers in the horticultural and fruit growing industries may be at greater risk of pesticide exposure than other agricultural industries (Table 9).

Table 9 Number of workers' compensation claims* associated with plant and animal treatment chemicals, by agricultural industry, Australia 2001-2003p

Industry	Plant treatment chemicals	Animal treatment chemicals	All chemical products
Horticulture & fruit growing	20	np	37
Grain, sheep & beef cattle	np	9	21
Dairy cattle	0	0	np
Poultry	0	0	np
Other livestock	0	0	np
Other crop	np	0	8
Total	25	12	78

Source: NOS12 Database, NOHSC website January 2005. 2003p=incomplete year

*Duration of absence was greater than one week

np Case number less than 5

Safe handling of pesticides is a priority for action in the horticultural industries.



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